



City of
Maple Grove

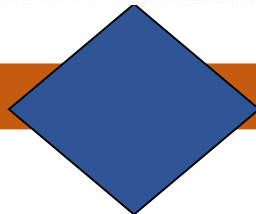
**STANDARD
SPECIFICATIONS FOR
UTILITY AND STREET
CONSTRUCTION**

City of Maple Grove
P.O. Box 1180
12800 Arbor Lakes Parkway
Maple Grove, MN 55311
763-494-600

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under State of Minnesota Statutes Section 326.02 to 326.16.

Ken Ashfeld, P.E., Director of Public Works/City Engineer

Date April 13, 2015 Reg. No. 16185





City of Maple Grove

STANDARD SPECIFICATIONS FOR UTILITY AND STREET CONSTRUCTION

CITY OF MAPLE GROVE, MINNESOTA

TABLE OF CONTENTS SECTION

CONDITIONS OF THE CONTRACT

GENERAL SPECIFICATIONS

WATERMAIN AND APPURTENANCES SPECIFICATION

SANITARY SEWER, STORM SEWER AND APPURTENANCES SPECIFICATION

PLANT MIXED BITUMINOUS CONSTRUCTION SPECIFICATION

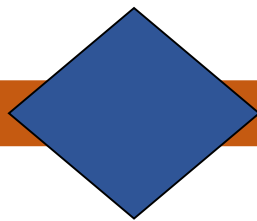
GRADING, LANDSCAPING AND TRAFFIC CONTROL SPECIFICATION

MINNESOTA CONCRETE FLATWORK SPECIFICATION

EROSION AND SEDIMENT CONTROL

ROADWAY LIGHTING

STANDARD DETAILS



CONDITIONS OF THE CONTRACT

CITY OF MAPLE GROVE, MINNESOTA

TABLE OF CONTENTS

January 2016

TABLE OF CONTENTS	PAGE #
SECTION 1 – DEFINITIONS	1
SECTION 2 – WORKING DAYS & HOURS	4
SECTION 3 – BIDDING REQUIREMENTS	4
SECTION 4 – AWARD OF THE CONTRACT	9
SECTION 5 – INTENT OF DRAWINGS AND SPECIFICATIONS	9
SECTION 6 – ENGINEER'S RESPONSIBILITY AND AUTHORITY	14
SECTION 7 – LANDS BY OWNER	19
SECTION 8 – MATERIALS AND WORKMANSHIP	21
SECTION 9 – INSURANCE, LEGAL RESPONSIBILITY, PUBLIC SAFETY AND MISCELLANEOUS	24
SECTION 10 – PROGRESS AND COMPLETION OF WORK	30
SECTION 11 – MEASUREMENT AND PAYMENT	34
SECTION 12 – EXHIBITS	
EXHIBIT A (SAMPLE ADVERTISEMENT FOR BIDS)	45
EXHIBIT B (SAMPLE AFFIDAVIT AND INFORMATION)	46
EXHIBIT C (SAMPLE AFFIRMATIVE ACTION QUESTIONNAIRE)	47
EXHIBIT D (SAMPLE CERTIFICATE OF INSURANCE)	48
EXHIBIT E (SAMPLE CONTRACTORS PAYMENT BOND)	49
EXHIBIT F (SAMPLE CONTRACTORS PERFORMANCE BOND)	54
EXHIBIT G (SAMPLE FORM OF AGREEMENT)	59
EXHIBIT H (SAMPLE INFORMATION FOR BIDDERS)	63
EXHIBIT I (SAMPLE PROPOSAL FORM)	64
EXHIBIT J (CARING FOR YOUR NEW SOD FACT SHEET 2015)	66
EXHIBIT K (SAMPLE RESPONSIBLE CONTRACTOR REQUIREMENTS)	67

- this page left intentionally blank -

CONDITIONS OF THE CONTRACT
CITY OF MAPLE GROVE, MINNESOTA

1. DEFINITIONS

a. CONTRACT DOCUMENTS

The contract documents consist of the following, including all addenda issued prior to the opening of bids and modifications issued after execution of the contract:

- i. Bid Documents (Advertisement, Information to Bidders, Proposal and Bid Security);
- ii. Agreement;
- iii. Performance and Payment Bond;
- iv. Project Specifications and Special Provisions thereof;
- v. Standard Specifications for Utility and Street Construction Maple Grove, dated 2015;
- vi. Conditions of the Contract (General Supplementary and other Conditions); and
- vii. Drawings.

b. CONTRACT

The contract documents form the contract. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral.

c. ENGINEER

The Engineer is the authorized representative of the Owner, as named in the contract documents.

d. OWNER

The Owner is the City of Maple Grove, a municipal corporation of the State of Minnesota, located in Hennepin County or as named in the contract documents.

e. CONTRACTOR

The Contractor is the person, entity or authorized representative thereof named in the contract documents to construct the project pursuant to plans and specifications.

f. SUBCONTRACTOR

The Subcontractor is any person or other entity acting for or on behalf of the Contractor in performing any part of the contract.

g. PROPOSAL

The proposal is the offer of a bidder to perform the work described in the bid documents when made out and submitted on the prescribed proposal form, properly signed and secured.

h. BID SECURITY

The bid security, where required by the advertisement or information to bidders, is a cashier's or certified check, cash or bid bond accompanying the proposal submitted by the bidder, pledging that the bidder will enter into an agreement with the owner for the carrying out of the work, should the contract for the work be awarded to him.

i. AGREEMENT

The agreement is the written contract between the owner and Contractor covering the performance of the work described in the contract documents. Other contract documents are attached to the agreement.

j. PERFORMANCE AND PAYMENT BOND

The performance and payment bond is the approved form of security furnished by the Contractor and his surety prior to the execution of the agreement as a pledge of good faith on the part of the Contractor, and the surety in the event of the Contractor's

default, covering the Contractor's faithful performance under the contract documents and the payment of all obligations arising thereunder. The terms and conditions of said bond are governed by M.S.A. Section 574.26 et. seq. and amendments thereto.

k. BIDDER

A bidder is an individual or other entity submitting a proposal for the advertised work.

l. SURETY

A surety is the person or other entity executing the Contractor's performance and payment bond.

m. SPECIFICATIONS

The specifications consist of the Standard Specifications for Utility and Street Construction; Maple Grove, dated 2015 and all subsequent amendments together with the project specifications. References made to MnDOT specifications shall mean the 2014 Standard Specifications for Construction of the Minnesota Department of Transportation dated April 29, 2013 and all subsequent revisions.

n. DRAWINGS

The drawings are all plans, drawings or reproductions of drawings issued by the Engineer pertaining to the work and provided for in the contract documents.

o. WRITTEN NOTICE

Written notice shall be deemed to have been served if delivered in person or sent by registered or certified mail to the individual or other entity or to the last known business address of such individual or entity. It shall be the duty of each party to advise the other parties to the agreement as to any change in the business address until completion and acceptance of the work.

p. ACTS OF GOD

An Act of God is an unusual, extraordinary and sudden manifestation of the forces of nature, uncontrolled and uninfluenced by the power of man and without human intervention, which could not under normal circumstances have been anticipated or expected.

Ordinary, expectable, and gradual weather conditions of normal intensity for the locality shall not be considered as an Act of God and the owner or Engineer shall not be liable to the Contractor for damage to the work resulting therefrom.

2. WORKING DAYS & HOURS

Within 500 feet of any residentially zoned property (other than R-A), no person shall engage in, permit, or allow construction activities involving the use of manual tools, movement of equipment or power equipment, including, but not limited to, any kind of electric, diesel, or gas-powered machine, at any time other than between the hours of 7:00 a.m. and 9:00 p.m. on weekdays, and 8:00 a.m. and 9:00 p.m. on Saturdays.

No work shall occur on Sundays or holidays without written authorization from a representative of the Owner.

3. BIDDING REQUIREMENTS

a. PROPOSAL FORMS

The Owner will furnish proposal forms to any qualified bidder upon request.

b. INTERPRETATION OF PLANS, SPECIFICATIONS AND WORK SITE

The quantities appearing in the proposal shall be used as the basis of calculation for comparison of proposals. The scheduled quantities are to be considered approximate only and may be increased, decreased or omitted as provided in Section 10.d.

c. EXAMINATION OF PLANS, SPECIFICATIONS AND WORK SITE

Each bidder is required to examine carefully the site of the work, the proposal forms, specifications and forms. Submission of a proposal shall be considered evidence that the bidder has made such examination and that he has familiarized himself with the conditions to be encountered, the character, quality and quantity of work to be performed and material to be furnished and the requirements of these contract documents.

d. ADDENDA

Any addenda issued by the Owner or Engineer prior to the time of receipt of proposals or prior to the date set for opening of proposals,

shall be included in the proposal and shall be made part of the contract documents. Receipt of each addendum shall be acknowledged by the bidder in his proposal.

e. PREPARATION OF BID

The bidder shall submit his proposal in duplicate on the proposal forms provided by the Owner. All blank spaces in the proposal must be filled in clearly and correctly in ink or typewritten. Any interlineation, alteration or erasure must be initialed by the signer of the proposal. The proposal shall be signed in ink by the individual or authorized representative making the proposal.

f. RESERVATION AND/OR EXCEPTIONS

Reservations or exceptions shall be clearly stated in writing and attached to the proposal. They will be deemed to be a part of and incorporated into the proposal. Bidders are advised that if such reservations or exceptions constitute a substantial deviation from the advertised terms and conditions, their proposals may be rendered non-responsive. The bidder shall make no additional stipulations on the proposal nor qualify it in any other manner.

g. BID SECURITY

If so stipulated in the advertisement or invitation to bid, each proposal shall be accompanied by a bid security in the required form and amount pledging that the bidder will enter into a contract with the owner on the terms stated in his proposal and will, if required, furnish bonds as described hereunder in Section 9.c covering the faithful performance of the contract and the payment of all obligations arising thereunder. Should the bidder refuse to enter into such contract or fail to furnish such bond, if required, the amount of the bid security shall be forfeited to the owner as liquidated damages, not as a penalty. The owner will have the right to retain the bid security of bidders until either (a) the contract has been executed and bonds, if required, have been furnished or (b) the specified time has elapsed for proposals to be withdrawn, or (c) all proposals have been rejected.

h. DELIVERY OF PROPOSAL

Each proposal shall be placed in an opaque envelope and securely sealed. The envelope shall be so marked as to indicate the name and address of the bidder, the type of work and the project

designation. If mailed, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "PROPOSAL ENCLOSED" on the face thereof. All proposals shall be in the office of the designated recipient before the time set for bid opening.

i. OPENING OF PROPOSALS

Proposals will be opened publicly and read aloud at the time, date and place designated in the advertisement.

j. EVALUATION OF PROPOSALS

The Owner reserves the right to reject any proposal if it shows any omissions, alterations, irregularities, is submitted after advertised bid closing, or is unaccompanied by any required bid security. The bidder further acknowledges the right of the Owner to reject all proposals and re-advertise with the same or different bid documents. In any event, the owner reserves the right to waive any informalities, irregularities or minor deviations in the proposal. Comparison of proposals will be made on the basis of the stated unit prices and unit prices will control in the event of a discrepancy between the unit price and the extension or summation thereof.

k. CERTIFICATE OF INDEPENDENT PRICE DETERMINATION

By submission of a proposal, each bidder certifies that:

- i. The prices in the proposal have been arrived at independently, without consultation, communication or agreement as to any matters relating to such prices with any other bidder or with any competitor for the purpose of restricting competition;
- ii. The prices which have been quoted in the proposal have not been or will not be knowingly disclosed to any other bidder or competitor prior to the opening of the proposals;
- iii. No attempt has been made or will be made by the bidder to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

l. AFFIRMATIVE ACTION – EQUAL OPPORTUNITY CERTIFICATE

The City of Maple Grove shall not use public funds to further any violations of State and Federal Equal Employment Laws. The City's

commitment to this shall be demonstrated through its Affirmative Action Requirements for Contractors, Subcontractors and Vendors with whom the City does business.

All bid specifications, request for bid forms and contracts for contract amounts of \$100,000 or above shall require all Contractors, Subcontractors and Vendors which have 40 or more employees full-time to submit a certified copy of their Affirmative Action Certification for the current period.

The City shall continue to award contracts for contract amounts of \$100,000 or over to the lowest bidder provided the bidder meets the City's Affirmative Action Requirements. If a Contractor, Subcontractor or Vendor which has 40 or more employees does not comply with the intent of the City's Affirmative Action Requirements as listed above, the contract will be awarded to the next lowest bidder with the same procedure applying.

If a Contractor, Subcontractor or Vendor which has 40 or more full time employees is found to be in violation of State or Federal Equal Employment Opportunity Laws or has no Affirmative Action Program or is not willing to comply and carry out the City's Affirmative Action Requirements, the City Administrator may immediately request that the City Attorney issue a "Letter of Show Cause" requesting the Contractor, Subcontractor or Vendor to provide the City Administrator with information showing why the City should not terminate the contract for Contracts of \$100,000 or more.

The context of Minnesota Statute 181.59 (as amended) is incorporated by reference here, and made a part of, this Affirmative Action Policy.

M.S. 181 EMPLOYMENT; WAGES, CONDITIONS, HOURS, RESTRICTIONS.
181.59 DISCRIMINATION ON ACCOUNT OF RACE, CREED, OR COLOR PROHIBITED IN CONTRACT. Every contract for or on behalf of the State of Minnesota or any County, City, Town, Township, School, School District or any other district in the State for which materials, supplies, or construction shall contain provisions by which the Contractor agrees:

That, in the hiring of common or skilled labor for the performance of any work under any contract or any subcontract hereunder, no Contractor, material supplier, or vendor shall by reason of race, creed or color discriminate against the person or persons who are

citizens of the United States, who are qualified and available to perform the work to which such employment relates;

That no Contractor, material supplier, or vendor shall in any manner discriminate against or intimidate or prevent the employment of any such person or persons or being hired, prevent, or conspire to prevent any such person or persons from the performance of work under any contract on account of race, creed, or color.

ANY VIOLATION OF THIS SECTION SHALL BE A MISDEMEANOR; AND That this contract may be canceled or terminated by the State, County, City, Town, School Board or any other person authorized to grant contracts for such employment and all money due or to become due hereunder may be forfeited for a second or subsequent violation of the terms of conditions of this contract.

m. RESPONSIBLE CONTRACTOR REQUIREMENTS

In addition to conforming to all responsibility requirements in the bid documents, a contractor responding to a bid solicitation must also meet the criteria in Minnesota Statutes, section 16C.285, subdivision 3 to be awarded this contract as the lowest responsible bidder. Any prime contractor or subcontractor that does not meet the minimum criteria of Minn. Stat. 16C.285, subd. 3 or fails to verify that it meets those criteria is not a responsible contractor/bidder and is not eligible to be awarded a construction contract for the project or to perform work on the project.

The contractor shall submit with its bid to the City a signed statement under oath by an owner or officer verifying compliance with each of the minimum criteria in Minn. Stat. 16C.285, subd. 3. A contractor shall include in its verification of compliance a list of all of its first-tier subcontractors that it intends to retain for work on the project. If a prime contractor or any subcontractor retains additional subcontractors after submitting its verification of compliance, the prime contractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and submit the verification to the City within 14 days of retaining the additional subcontractors. A false statement on a verification of compliance shall render the prime contractor or subcontractor ineligible to be awarded the construction contract and may result in termination of the contract without liability to the City. A prime contractor shall submit to the City upon request copies of the signed verifications of compliance from all subcontractors.

4. AWARD OF THE CONTRACT

When the proposal of the lowest responsible bidder is accepted the owner will send him the necessary contract documents and a notice that the contract has been awarded to him, subject to the furnishing of a performance and payment bond, where required.

a. PERFORMANCE AND PAYMENT BOND

Where required and prior to or at the time of the execution of the agreement the bidder determined to be the lowest responsible bidder shall furnish a public Contractor's bond as required by M.S.A. Section 574.26 et. seq. and amendments thereto.

b. EXECUTION OF AGREEMENT

The lowest responsible bidder shall, within 15 days after receiving the notice of award, sign the agreement contained in the contract documents and return the signed agreement and other contract documents to the Owner. No proposal will be considered as binding on the Owner until the contract has been approved and executed by all parties.

c. FAILURE TO EXECUTE CONTRACT

Upon the failure of the lowest responsible bidder to furnish an acceptable bond, where required, or to execute the contract within the time above specified, the Owner may have the option to annul the award and retain the bid security accompanying the bid as liquidated damages and not as a penalty. This shall not be the sole remedy of the Owner but upon default by the bidder the Owner may adopt any legal remedy which it may see fit to adopt.

d. RETURN OF BID SECURITY

All bid securities, except that of the lowest responsible bidder, will be returned after the date of the opening of proposals, and within the time frame provided in the bid documents. The bid security of the lowest responsible bidder will be returned upon receipt of the properly executed contract.

5. INTENT OF DRAWINGS AND SPECIFICATIONS

The intent of the drawings and specifications is that the Contractor shall furnish all labor and materials, equipment and transportation necessary for

the proper execution of the work unless specifically noted otherwise. The Contractor shall do all the work shown on the drawings and described in the specifications and all incidental work considered necessary to complete the project in an acceptable manner, and to fully complete the work or improvement, ready for use, occupancy and operation by the Owner.

a. ORDER OF PRECEDENCE

If there be a conflict between or among any of the terms or provisions of the Contract Documents, the following order of precedence shall apply:

- i. Agreement
- ii. Project Specifications and Special Provisions thereof
- iii. Standard Specifications for Utility and Street Construction
Maple Grove, dated 2015
- iv. Conditions of the Contract (general supplementary and other
conditions)
- v. Drawings
- vi. Bid Proposal

b. DISCREPANCIES

Any ambiguity or discrepancy in the drawings and specifications, no matter how seemingly insignificant to the Contractor, shall be brought immediately to the attention of the Engineer for clarification. Any Contractor who fails to bring any ambiguity or discrepancy of which it was or should have been aware, shall assume the risk of loss because of, and shall be allowed no claim for the misinterpretation of the drawings and specifications contrary to the intended interpretation of the Engineer.

c. ADDITIONAL INSTRUCTIONS

Further or additional instructions may be issued by the Engineer during the progress of the work by the use of drawings or other means to clarify the contract documents or to explain or illustrate changes in the work to be done.

d. COPIES OF DRAWINGS AND SPECIFICATIONS FURNISHED

Except as provided for otherwise, five (5) copies of drawings and specifications shall be furnished to the Contractor without charge. Any additional copies requested by Contractor shall be furnished upon payment of charges made at the prevailing rate charged by the Owner.

e. DRAWINGS AND SPECIFICATIONS AT JOB SITE

One complete set of all drawings and specifications, addenda, approved shop drawings, change orders and other modifications shall be maintained by the Contractor at the job site and shall be available to the Engineer at all times.

f. OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications and copies thereof and other data furnished by the Engineer are and shall remain his property. They are to be used only with respect to this project and are not to be used on any other project. Said documents are to be returned or suitably accounted for to the Engineer on request at the completion of the work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of the Engineer's common law copyright or other reserved rights.

g. DIMENSIONS

Figured dimensions on the plans will be used in preference to scaling the drawings. Where the work of the Contractor is affected by dimensions, these shall be determined by the Contractor at the site, and he shall assume the responsibility therefor.

h. SAMPLES

All samples called for in the specifications or required by the Engineer shall be furnished by the Contractor and shall be submitted to the Engineer for his approval. Samples shall be furnished so as not to delay the project. The Contractor shall furnish such samples of material as may be required for examination and testing. All materials and workmanship shall be in accordance with approved samples. All samples of materials for tests shall be taken according to methods provided for in the specifications.

i. PRODUCT DATA

Product data are illustrations, standard schedules, performance charts, instruction, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the work.

j. SHOP DRAWINGS

The Contractor shall provide shop drawings, settings, schedules and such other drawings as may be necessary for the prosecution of the work in the shop and in the field as required by the drawings, specifications or Engineer's instructions. Deviations from the drawings and specifications shall be called to the attention of the Engineer at the time of the first submission of shop drawings and other drawings for approval. The Engineer's approval of any drawings shall not release the Contractor from responsibility for such deviations.

Shop drawings shall be promptly submitted by the Contractor after he has reviewed, checked and approved the data to determine that they are in harmony with the requirements of the project and with the provisions of the contract documents and after he has verified all field measurements and construction criteria, materials, catalog numbers and similar data. In submitting the shop drawings the Contractor is certifying that the work represented by the shop drawings is recommended by the Contractor.

Shop drawings shall be submitted according to the following schedule:

- i. Three (3) copies shall be submitted with reasonable promptness and in such sequence as to prevent delay of the work.
- ii. The Engineer shall, within 14 days of the submittal of any shop drawings, or within a reasonable time period return one copy to the Contractor marked with corrections and changes.
- iii. The Contractor shall then promptly correct the shop drawings to conform to the corrections and changes requested by the Engineer.
- iv. Following completion of such corrections and changes, the Contractor shall promptly furnish the Engineer two (2) copies of the shop drawings conforming to the required corrections

and changes.

k. QUALITY OF EQUIPMENT AND MATERIALS

In order to establish standards of quality, the Engineer, in the specifications, has referred to certain products by name and catalog number. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design unless otherwise specifically stated in the specifications or special provisions.

The Contractor shall furnish the complete list of proposed substitutions prior to the bidding opening date, together with such Engineering and product data as the Engineer may require. The owner requires that product substitutions be pre-approved prior to bidding the project.

The Contractor shall abide by the Engineer's recommendation when proposed substitute materials or items of equipment are not recommended for installation and shall furnish the specified material or item of equipment in such case. All proposals for substitutions shall be submitted in writing by the general Contractor and not by individual trades or material suppliers. The Engineer will review proposed substitutions and make his recommendations in writing within a reasonable time.

l. FURNISHING OF PRODUCT DATA

The Contractor shall furnish one (1) copy of complete product data for every manufactured item of equipment and all components to be used to perform the work, including specific performance data, material description, rating, capacity, working pressure, material gauge or thickness, brand name, catalog number and general type.

This data shall be compiled by the Contractor and reviewed by the Engineer before any of the equipment is ordered.

All data shall be indexed according to specification section and paragraph for easy reference.

After review, this data shall become a part of the contract, and may not be deviated from except upon written approval of the Engineer.

Product data for equipment reviewed by the Engineer does not in any case supersede the contract documents. The review of the

Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications unless he has in writing called the Engineer's attention to such deviations at the time of furnishing said data. Nor shall such review relieve the Contractor from responsibility for errors of any sort in the items furnished. The Contractor shall check the work described by the product data with the contract documents for deviations and errors.

It shall be the responsibility of the Contractor to insure that items to be furnished fit the space available. He shall make necessary field measurements to ascertain space requirements, including those for connections, and shall order such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.

Where equipment requiring different arrangement of connections from those shown is approved, it shall be the responsibility of the Contractor to install the equipment so as to allow for proper operation and to be in harmony with the intent of the drawings and specifications, and to make all changes in the work required by the different arrangement of connections.

Product data shall be promptly submitted by the Contractor after he has reviewed, checked and approved the data to determine if they are in harmony with the requirements of the project and with the provisions of the contract documents and after he has verified all field measurements and construction criteria, materials, catalog numbers and similar data. In submitting the product data, the Contractor is certifying that the work represented by the data is recommended by the Contractor.

6. ENGINEER'S RESPONSIBILITY AND AUTHORITY

The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, rate of progress of work, interpretation of drawings and specifications and all questions as to the acceptable fulfillment of the contract on the part of the Contractor.

Claims, disputes, disagreements, or other matters in question between the Contractor and the Owner relating to the execution or progress of the work or the interpretation of the contract documents shall be referred initially to the Engineer for decision which he will render in writing within a reasonable time.

a. OBSERVATION OF WORK

All materials and each part or detail of the work shall be subject at all times to observation by the Engineer and the Owner, and the Contractor will be responsible for strict adherence to the true intent of the specifications in regard to quality of materials, workmanship, and the diligent execution of the work. Such observations may include mill, plant, or shop inspection, and any material furnished under these specifications is subject to such observation. The Engineer shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is required to make his observations and construction review.

b. CONTRACTOR'S SUPERINTENDENT

A competent superintendent, who is acceptable to the Owner, shall give efficient supervision to the work until its completion and shall be available to the work site when given verbal notice. The superintendent shall have full authority to act on behalf of the Contractor, and all communications given to the superintendent or in his absence the project foreman, shall be as binding as if given to the Contractor. Important communications shall be confirmed by the Engineer in writing. Other communications shall be so confirmed upon written request of the Contractor. It shall be the responsibility of the Contractor's superintendent to coordinate the work of all the Subcontractors. When required, the superintendent shall be present on the site to perform adequate supervision and coordination.

c. ASSIGNMENT OF CONTRACT

The Contractor shall neither sublet, sell, transfer, assign or otherwise dispose of the contract or any portion thereof, or of his right, title or interest therein, or his obligations hereunder, nor, if the Contractor is a corporate entity, sublet, sell, transfer or assign a majority of the outstanding shares of stock in the corporation, without prior written consent of the Owner. In case written consent is given, the Contractor will be permitted to sublet a portion of the contract or corporate stock thereof, but shall perform, with his own organization, work amounting to not less than 50% of the total original contract cost. No subcontracts or transfer of contract or corporate stock shall release the Contractor of his liability under the contract or bonds.

d. SUSPENSION OF WORK

The Owner or Engineer shall have the authority to suspend the work, wholly or in part, for such period or periods, as he may deem necessary, due to unsuitable weather or such other conditions as are considered unfavorable for prosecution of the work, or failure on the part of the Contractor to carry out the provisions of the contract or to supply materials meeting the requirements of the specifications.

Said suspension shall be effective provided the Owner gives the Contractor three (3) days written notice of suspension. The Contractor shall resume the work within ten (10) days after notice to resume work is given by the Owner to the Contractor.

e. OWNER'S RIGHT TO CORRECT DEFICIENCIES

Where it is not an emergency and upon failure of the Contractor to perform the work in accordance with the contract documents, including any requirements with respect to the schedule of completion, and after five (5) days written notice to the Contractor, the Owner may, without prejudice to any other remedies he may have, correct such deficiencies. In the case of an emergency the Owner shall have the right to correct the defective work immediately with payment pursuant to Section 11.m.

f. OWNER'S RIGHT TO TERMINATE CONTRACT AND COMPLETE THE WORK

If the Contractor defaults or neglects to carry out the work in accordance with the contract documents, the Owner shall have the right to terminate the Contract after giving ten (10) days written notice of termination to the Contractor. In the event of such termination, the Owner may take possession of the work and of all materials, tools and equipment thereon and may finish the work by whatever method and means he may select. Tools and equipment are defined as those items included in the proposal form and are not intended to be construed as being the Contractor's equipment used for installation purposes.

It may be considered a default at the sole discretion of the Owner if the Contractor shall:

- i. File a petition in bankruptcy, attempt a reorganization under the bankruptcy laws, become insolvent, make a general assignment for the benefit of his creditors, or if a trustee or

receiver be appointed;

- ii. Disregard or violate the provisions of the contract documents, laws, regulations or orders of any public body having jurisdiction or fail to prosecute the work according to the agreed schedule of completion, including extensions thereof; or
- iii. Fail to provide a competent superintendent, workmen or Subcontractor, or proper materials, or fail to make prompt payments therefor.

g. CONTRACTOR'S RIGHT TO SUSPEND OR TERMINATE CONTRACT

The Contractor may suspend the work or terminate the contract after giving ten (10) days written notice to the Owner and the Engineer due to the occurrence of any one of the following:

- i. If an order of any court or other public authority caused the work to be stopped or suspended for a period of 90 days through no act or fault of the Contractor or any of his employees;
- ii. If the Engineer should fail to act upon any request for payment within 20 days after it is presented in accordance with the conditions of the contract;
- iii. If the Owner should fail to act upon any request for payment within 30 days after its approval by the Engineer.

h. RIGHTS OF VARIOUS INTERESTS

Wherever work being done by the Owner's forces or by other Contractors is contiguous to work covered by this contract, the respective rights of the various interests involved shall be established by agreement to secure the completion of the various portions of the work in general harmony.

i. SEPARATE CONTRACTS

The Owner may let other contracts in connection with the work of the Contractor. The Contractor shall cooperate with other Contractors with regard to storage of materials and execution of their work. It shall be the Contractor's responsibility to inspect all work by other Contractors affecting his work and to report to the Engineer any

irregularities which will not permit him to complete his work in a satisfactory manner. His failure to notify the Engineer of such irregularities shall indicate the work of other Contractors has been satisfactorily completed to receive his work. The Contractor shall not be responsible for defects of which he could not have known, which develop in the work of others after the work is completed. It shall be the responsibility of the Contractor to measure the completed work in place and report to the Engineer immediately any difference between completed work by others and the drawings.

j. SUBCONTRACTS

Unless otherwise specified in the contract documents, the Contractor shall, upon receipt of the executed contract documents, submit in writing to the Owner the names of all Subcontractor proposed for the work. Subcontractors may not be changed except at the request or with the consent of the Owner.

The Contractor is responsible to the Owner for the acts and omissions of his Subcontractors, and of their direct and indirect employees, to the same extent as he is responsible for the acts and omissions of his employees.

The contract documents shall not be construed as creating any contractual relation between the Owner, the Engineer and any Subcontractor.

The Contractor agrees to bind every Subcontractor and every Subcontractor agrees to be bound by the terms of the contract documents as far as applicable to his work.

For convenience of reference and to facilitate the letting of contracts and subcontracts, the specifications are separated into titled sections. Such separations shall not, however, operate to make the Engineer an arbiter to establish limits to the contracts between Contractor and Subcontractors.

k. WORK DURING AN EMERGENCY

In any emergency affecting the safety of persons or property, the Contractor shall act to prevent threatened damage, injury or loss. In all cases he shall, as soon as practicable, notify the Owner of the emergency and he shall not wait for instructions before proceeding to protect both life and property.

Any additional compensation or extension of time claimed by the Contractor on account of said emergency work shall be determined under Section 11.j.

I. ORAL AGREEMENTS

Verbal orders and suggestions as to the performance of the work may be given from time to time by the Engineer, or by other representatives of the Owner. However when, in the opinion of the Contractor, such verbal orders or suggestions entitle him to a change in contract price or time or both, he must request a change order from the Owner. No verbal order or suggestion of any representative or employee of the Owner, or of any other person, shall be construed as authorizing any claims on the part of the Contractor for extra compensation for labor, material, or other items pertaining to such work, or for damages or any other expenses incurred because of the Contractor's compliance therewith.

m. NONDISCRIMINATION IN EMPLOYMENT

For work under this contract the Contractor must agree:

- i. That in the hiring of common or skilled labor for the performance of any work under this contract or any subcontract hereunder, no Contractor, material supplier or vendor shall, by reason of race, creed, color or national origin, discriminate against the person or persons who are qualified and available to perform the work to which such employment relates.
- ii. That no Contractor, material supplier or vendor shall, in any manner, discriminate against or intimidate or prevent the employment of any person or persons, or on being hired, prevent or conspire to prevent any person or persons from the performance of the work under this contract on account of race, creed, color or national origin.
- iii. Violation of this section shall be cause for cancellation or termination of this contract.

7. LANDS BY OWNER

The Owner shall provide, not later than the date specified in the construction schedule as approved by the Engineer, the lands shown on the drawings upon which the work under the contract is to be

performed. The Owner shall also provide rights-of-way for access thereto. Any delay in furnishing these lands by the Owner shall be deemed proper cause for consideration of adjustment in the time of completion.

a. LANDS BY CONTRACTOR

Any additional land and access thereto not shown on the drawings that may be required for temporary construction facilities or for storage of materials shall be provided by the Contractor with no liability to the Owner. The Contractor shall confine his apparatus and storage of materials and operation of his workmen to those areas described in the drawings and specifications and such additional areas which he may provide at his expense. The Contractor shall have written approval for use of those lands provided at his expense and submit said written approval to Engineer prior to using land(s).

b. PRIVATE PROPERTY

The Contractor shall not enter upon private property for any purpose without obtaining permission from the owner thereof, and he shall be responsible for the preservation of all public property, trees, monuments, etc., along and adjacent to the street and/or right-of-way, and shall use every precaution necessary to prevent damage or injury thereto. He shall protect carefully from disturbance or damage all monuments and property marks until an authorized agent has witnessed or otherwise referenced their location and shall not remove them until directed.

c. SURVEYS

Unless otherwise specified, the Engineer retained by the Owner shall establish all surveys and elevations in accordance with Mn/DOT specification 1508 including staking for proposed underground utilities. Based upon the information provided by the Engineer, the Contractor shall develop and make all detail surveys necessary for construction, including laser, and other working points, lines and elevations. The Contractor shall be responsible for carefully preserving bench marks, reference points and stakes, and, in the case of destruction thereof resulting from his negligence or otherwise, the Contractor shall be charged with the expense and damage resulting therefrom and shall be responsible for any mistakes that may be caused by the unnecessary loss or disturbance of such bench marks, reference points and stakes.

d. UTILITIES

The Contractor shall be solely responsible for verifying the exact location of all utilities. Prior to the start of any construction, the Contractor shall notify all utility companies having utilities in the project area. The Contractor shall have sole responsibility for providing temporary support and for protecting and maintaining all existing utilities in the project area during the entire period of construction including, but not limited to, the period of excavation, backfill and compaction. In carrying out this responsibility, the Contractor shall exercise particular care, whenever gas mains or other utility lines are crossed, to provide compacted backfill or other stable support for such lines to prevent any detrimental displacement, rupture or other failure.

8. MATERIALS AND WORKMANSHIP

a. MATERIALS FURNISHED BY CONTRACTOR

All materials used in the work shall be new unless otherwise provided for in the contract documents, shall meet the requirements of the specifications, and shall not be incorporated into the work until reviewed by the Engineer.

Unless otherwise specifically indicated in the contract documents, all materials necessary for the proper execution of the work shall be furnished and paid for by the Contractor, whether temporary or not and whether incorporated into the work or not.

b. MATERIALS FURNISHED BY OWNER

Materials specifically indicated shall be furnished by the Owner. Before incorporating any of the materials into the work, the Contractor shall inspect the materials so furnished by the Owner. If the Contractor discovers any patent defects in material furnished by the Owner, he shall notify the Engineer.

Unless otherwise noted or specifically stated, materials furnished by the Owner are considered to be f.o.b. the nearest railroad station or truck line. The Contractor shall transport the materials to the job site, unload and properly protect all such materials from damage or loss. The Contractor shall be responsible for material loss or damage after receipt of material at the point of delivery.

c. STORAGE OF MATERIALS

Materials shall be so stored by the Contractor as to insure the preservation of their quality and fitness for the work. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the Owner or lessee thereof.

d. CONDUCT OF WORKMEN

The qualifications and conduct of workmen shall be in accordance with MN/DOT Specification 1802.

e. REJECTED WORK AND MATERIALS

All materials, whether furnished by the Owner or Contractor, which do not conform to the requirements of the contract documents, or which are not equal to samples or other product data reviewed by the Engineer, or which are in any way unsatisfactory to the Owner or unsuited to the purpose for which they are intended, shall be rejected. Any defective work whether the result of poor workmanship, use of defective materials, damage through carelessness or any other cause shall be removed within ten (10) days after written notice is given by the owner, and the work shall be re-executed by the Contractor. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance of any part of it.

Should the Contractor fail to remove rejected work or materials within (10) days after written notice to do so, the Owner may remove them and may store the materials.

Correction of faulty work after final payment shall be in accordance with Section 11.v.

f. MANUFACTURER'S DIRECTIONS

Manufactured supplies, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

g. CUTTING AND PATCHING

The Contractor shall do all necessary cutting, fixing or patching of the work that may be required to make its several parts fit together properly, or to properly receive the work of the various trades, or, as required by the drawings and specifications, to complete the work. He shall restore cut or patched work as approved by the Engineer. Cutting of any existing structure that shall endanger the work, adjacent property, workmen or the public shall not be done.

h. WARRANTY

A Contractor shall expressly warrant the workmanship, equipment and materials furnished to be in compliance with the terms of the contract documents. The said warranty shall extend for a full two (2) year period from and after the acceptance of the project by the Owner. If any of the work is found to be defective or not in accordance with the contract documents, the Contractor shall correct the said condition promptly after receipt of written notice from the Owner. Prior to commencement of the corrective work, the Contractor shall provide insurance certificate policies, in accordance to Section 9 herein. So as to protect the Owner, its Engineer or agents during the performance of the warranty work. Acceptance by the Owner for the purpose of beginning the warranty period will be deemed to be when the project is finally accepted by the Maple Grove City Council; however, in the case of a project which includes both utility improvements and street improvement, the Owner could accept the utility portion of the project upon written request by the Contractor and recommendation of the project Engineer after the utility portion has been completed and is capable of being put into service by the Owner.

Implied warranties as of the date of the contract shall also apply.

The Contractor's performance and payment bond delivered to the Owner pursuant to the contract shall cover the Contractor's obligations provided for herein.

9. INSURANCE, LEGAL RESPONSIBILITY, PUBLIC SAFETY AND MISCELLANEOUS

a. INSURANCE

The Contractor shall secure and maintain such insurance from an insurance company authorized to write casualty insurance in the state where the work is located as will protect himself, his Subcontractors, and the Owner and Engineer from claims for bodily injury, death or property damage which may arise from work performed under the contract documents. The Contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and shall have filed the certificate of insurance or the certified copy of the insurance policy with the Owner and Engineer. Each certificate of insurance shall contain as additional named insureds the owner, the Engineer and his consultants, and each of their officers, employees and agents and any other person with an insurable interest designated by the Owner as an additional named insured. Each certificate of insurance and policy shall contain a clause providing that it shall not be cancelled by the insurance company without thirty (30) days written notice to the Owner of intention to cancel. See Exhibit D for an example at the end of this specification.

Unless otherwise specifically waived in writing signed by the Owner, the required insurance shall not be less than the following:

- i. Workmen's Compensation and Employer's Liability Insurance:
Shall be secured and maintained as required by the State of Minnesota.
- ii. Public Liability, Personal Injury, and Property Damage:
 1. Injury or death of one person....\$2,000,000
 2. Injury to more than one person
in a single accident.....\$2,000,000
 3. Property damage.....\$2,000,000
- iii. X-C-U Hazards: Same limits as for (ii) above. Under this provision it is required that basic exclusions for explosions, collapse, and underground hazards be removed from the policy, and as indicated as covered in the declarations and on certificates of insurance.

iv. Automobile and Truck Public Liability, Personal Injury and Property Damage, including Owned and Non-Owned Vehicles:

1. Injury or death of one person....\$2,000,000
2. Injury to more than one person
in a single accident.....\$2,000,000
3. Property damage.....\$2,000,000

- v. All Risk and/or Installation Floater: Before commencement of the work, the Contractor shall submit written evidence that he has obtained, for the period of the contract, builder's risk "all-risk" completed value insurance coverage excluding flood upon the entire project which is the subject of this contract and including completed work and work in progress. Such insurance shall include as additional named insureds the Owner, the Engineer and his consultants, and each of their officers, employees and agents, and any other persons with an insurable interest designated by the owner as an additional named insured. Such insurance may have a deductible clause but amount of deductible shall not exceed \$5,000.00. This insurance coverage shall not apply to a contract with no overhead building or structures which would be a part of, or effect the construction of the project.

An umbrella or excess policy over primary liability coverages is an acceptable method to provide the required insurance limits.

The above subparagraphs establish minimum insurance requirements. It is the sole responsibility of the Contractor to determine the need for and to procure additional insurance that may be needed in connection with the construction of the project

b. INDEMNITY

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless the Owner, Owner's elected officials and employees, Architect and the directors, officers, shareholders, employees and agents of any of the above mentioned parties (the "Indemnified Parties") from and against any and all loss, cost, expense, damage, injury, liability, claim, demand, penalty or cause of action (including attorneys' fees), directly or indirectly arising out

of, resulting from or related to (in whole or in part), (1) the Work performed hereunder, (2) the Contract or (3) the act or omission of Contractor, a Subcontractor or any individual, partnership, joint venture or corporation (a) directly or indirectly employed by Contractor or a Subcontractor or (b) for whose acts or omissions Contractor or a Subcontractor may be liable (excluding property damage to the Work itself, covered by the Owner's all-risk builder's risk insurance, subject to Contractor's liability for any deductible amount thereunder). The obligations of Contractor under this indemnification shall apply to all matters except those arising from the use and occupation by the Owner and its invitees of the building being renovated and expanded pursuant to the Contract or except those arising from the gross negligence of the Owner. Further, the obligations of Contractor under this indemnification shall not extend to the liability of the Architect, their agents or employees, arising out of (1) the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications or (2) the giving of or the failure to give directions or instructions by the Architect, their agents or employees provided such giving or failure to give is the provided such giving or failure to give is the primary cause of the injury or damage. Contractor shall promptly advise Owner in writing of any action, administrative or legal proceeding or investigation as to which this indemnification may apply, and Contractor, at Contractor's expense, shall assume on behalf of Owner and conduct with due diligence and in good faith the defense thereof with counsel satisfactory to the Owner; provided, that the Owner shall have the right to be represented therein by advisory council of its own selection and at its own expense; and provided further, that if the defendants in any such action include both Contractor and Owner shall have reasonably concluded that there may be legal defenses available to it which are different from or additional to, or inconsistent with, those available to Contractor, the Owner shall have the right to select separate counsel to participate in the defense of such action on its own behalf at Contractor's expense. In the event of failure by Contractor to fully perform in accordance with this indemnification paragraph, the Owner, at its option, and without relieving the Contractor of its obligations hereunder, may so perform, but all costs and expenses incurred by the Owner in that event shall be reimbursed by the Contractor to the Owner, together with interest on the same from the date any such expense was paid by the Owner until reimbursed by Contractor, at the rate of interest provided to be paid on judgments, by the law of the jurisdiction to which the interpretation of the Contract is subject.

The obligations of the Contractor under this Section shall survive the expiration or termination of the Contract.

In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Section shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable or for the Contractor or any Subcontractor under worker's or workmen's compensation acts, disability benefit acts or other employee benefit acts.

C. PERFORMANCE AND PAYMENT BOND

The Contractor shall, at the time of his execution of the agreement furnish a performance and payment bond as security for the faithful performance and payment of all his obligations under the contract. Such bonds shall be in a sum equal to the contract amount. The form of the bond shall be as the owner may prescribe and with a surety company authorized to do business in the state where the work is located and which is named in the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Federal Register.

d. PATENTS, FEES AND ROYALTIES

Contractor shall pay all license fees and royalties and assume all costs incidental to the use in the performance of the work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the contract documents for use in the performance of the work and if to the actual knowledge of owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by owner in the contract documents. Contractor shall indemnify and hold harmless, the Owner and Engineer, and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorneys' fees) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, product or device not specified in the contract documents, and shall defend all such claims in connection with any alleged infringement of such rights.

e. PERMITS AND LICENSES

All permits and licenses necessary for the performance of the work shall be secured by the Contractor prior to the commencement of the work. The Contractor shall also pay all public utility charges.

f. LAWS, REGULATIONS AND SAFETY

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations applicable to the work. If the Contractor observes that the specifications or drawings are at variance therewith, he shall give Engineer prompt written notice thereof, and any necessary changes shall be adjusted by an appropriate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to Engineer, he shall bear all costs arising therefrom; however, it shall not be his primary responsibility to make certain that the specifications and drawings are in accordance with such laws, ordinances, rules and regulations.

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- i. all employees on the job and other persons who may be affected thereby;
- ii. all the work and all materials or equipment to be incorporated therein, whether in storage on or off the site; and
- iii. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. He shall erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for its safety and protection. He shall notify owners of adjacent utilities when prosecution of the work may affect them. All damage, injury or loss to any property referred to in Sections 9.f.ii and iii caused, directly

or indirectly, in whole or in part, by Contractor, any Subcontractor or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by Contractor. The Contractor's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and the Engineer has issued a notice to the Owner and the Contractor that work is acceptable.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents.

This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to The Owner.

g. WARNING SIGNS AND BARRICADES

The Contractor shall provide adequate signs, barricades, colored lights and/or watchmen and take all necessary precautions for the protection of the work and the safety of the public. All barricades and obstructions shall be protected at night by colored signal lights which shall be kept in operation from sunset to sunrise.

h. PUBLIC CONVENIENCE

The Contractor shall at all times so conduct his work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the Owner and proper governmental authority. Fire hydrants on or adjacent to the work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches and irrigation ditches, which shall not be obstructed.

i. CROSSING UTILITIES, ETC.

Where the prosecution of the work results in the crossing of highways, railroads, streets or utilities under the jurisdiction of state, county, city or other public or private entities, the Contractor shall secure written permission from the proper authority to cross said highway, railroad, street or utility before further prosecuting the work. A copy of the written document granting permission shall be filed with the Owner

and Engineer before any work is done. The Contractor shall be required to obtain a written release from the applicable authority upon completion of the work. A copy of this written release shall be filed with the Owner and Engineer before final acceptance of the work is granted.

j. SANITARY PROVISIONS

The Contractor shall provide and maintain such sanitary facilities for the use of his employees and those of his Subcontractors as may be necessary to comply with the laws, rules or regulations of the Federal, State and local governments, or agencies or departments thereof.

k. PRESERVATION OF HISTORICAL OBJECTS

Where historical objects of potential archeological or paleontological nature are discovered within the areas on which the Contractor's operations are in progress, the Contractor shall restrict or suspend his operations in the immediate area of the discovery as may be necessary to preserve the discovered objects until the Owner has made arrangements for their disposition or has recorded the desired data relative thereto.

The Contractor shall immediately notify the Owner of any historical objects he may discover or become aware of as the work is being prosecuted, and shall aid in the preservation and salvage program decided upon, as may be requested or ordered by the Owner. No work which the Contractor considers to be extra work shall be performed without the written authorization of the Owner.

The Owner shall have the right to restrict or suspend the Contractor's operations in the immediate area where historical objects are discovered for a period not to exceed 72 hours, without claim being made by the Contractor for any damages he might suffer as a result thereof. Any restrictions imposed shall not remain in effect for a period exceeding 72 hours unless mutually agreed to in writing.

10. PROGRESS AND COMPLETION OF WORK

a. NOTICE TO PROCEED

The date of commencement of the work is the date set forth in the notice to proceed. If there is no notice to proceed, commencement shall be the date of the contract or such other date as may be established therein. Thereupon, the Contractor shall begin and shall

prosecute the work regularly and without interruption, unless otherwise directed in writing by the Owner, with such manpower and equipment as is necessary to complete the work within the time stated in the contract documents.

b. CONTRACT TIME

The Contractor shall complete, in an acceptable manner, all of the work contracted for in the time stated in the contract documents.

c. SCHEDULE OF COMPLETION

The Contractor shall submit, at such time as may reasonably be requested by the Engineer, schedules which shall show the order in which the Contractor proposes to carry on the work, with dates at which the Contractor will start the several parts of the work and estimated dates of completion of the several parts. The construction schedule shall be submitted for approval by the Engineer and Owner no later than 10 days after preconstruction conference.

d. CHANGES IN THE WORK

Change Orders. A change order is a written order to the Contractor signed by the owner, issued after execution of the contract, authorizing a change in the work or an adjustment in the contract sum or contract time. A change order signed by the Contractor indicates his agreement therewith, including the adjustment in the contract sum or contract time and any claims for delay or work acceleration. Change orders are required if the change in work exceeds \$5,000.00.

Without invalidating the contract, the owner may, at any time or from time to time order additions, deletions or modifications in the work; these will be authorized by change orders. Upon receipt of a change order, Contractor shall proceed with the work involved. All such work shall be performed under the applicable conditions of the contract documents. If any change order causes an increase or decrease in the contract price or an extension or shortening of the contract time, an equitable adjustment will be made as provided in Section 11 if requested by either party.

Additional work performed by the Contractor without authorization of a change order will not entitle him to an increase in the contract price or an extension of the contract time, except in the case of an

emergency as provided in Section 6.l and except as provided in Section 10.d "Minor Changes in the Work".

Minor Changes in the Work. Engineer may authorize minor changes or alterations in the work not involving extra cost and not inconsistent with the overall intent of the contract documents. These may be accomplished by a work order. If Contractor believes that any minor change or alteration authorized by Engineer entitled him to an increase in the contract price, he may make a claim therefor as provided in Section 11.

Extra Work. New and unforeseen items of work found by the Engineer or Owner to be necessary and which cannot be covered by any item or combination of items for which there is a contract price shall upon notice thereof to the Owner and not more than 20 days after discovery thereof be classed as extra work. The Contractor shall do such extra work and furnish such material as may be required for the proper completion or construction of the whole work contemplated upon written order from the Owner as approved by the Engineer. In the absence of such written order, no claim for extra work shall be considered. Extra work shall be performed in accordance with these specifications where applicable and work not covered by the specifications or special provisions shall be done in accordance with the best practice and in a workmanlike manner. Extra work required in any emergency to protect life and property shall be performed by the Contractor as required.

Claims for Additional Cost. If the Contractor wishes to make a claim for an increase in the contract sum, he shall give the Owner and Engineer written notice thereof within 20 days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Section 6.l. No such claim shall be valid unless so made. If the owner and the Contractor cannot agree on the amount of the adjustment in the contract sum, it shall be determined by the Engineer. Any change in the contract sum resulting from such claim shall be authorized by change order.

Overrun of Unit Price Items. The City recognizes that the bid price is based on estimated quantity multiplied by unit price for each of the said quantities. The City also recognizes the contract calls for a final contract price which is the actual quantities used on the project multiplied by the unit price bid for each specific bid item. The Owner limits herein the amount the Owner will pay for increases in the

number of units applied to the project over and above the estimated number of units as set forth in the plans and specifications.

Unless a change order in writing is approved by the City Council or the City Engineer where changes to the contract amount are less than \$5,000.00 in value, the Owner will not pay for an increase in units. Where changes to the contract exceed \$5,000.00, approval must first be obtained from the Engineer. After Engineer's approval, Contractor may be able to begin work on said Change Order if approval is given verbally or in writing by Engineer to begin work.

(NOTE: Change orders over \$5,000.00 authorized by the Engineer to prevent delay to the project shall be submitted to the City Council at the discretion of the Engineer.)

e. USE OF COMPLETED PORTIONS

The Owner shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding that the time for completing the entire work or such portions may not have expired. The Owner will seek to minimize the delay to the Contractor occasioned by the Owner's occupancy before acceptance.

f. EXTENSION OF CONTRACT TIME

A delay beyond the Contractor's control occasioned by an Act of God, or act or omission on the part of the owner or by strikes, lockouts, fire, etc., may entitle the Contractor to an extension of time in which to complete the work as determined by the Owner provided, however, that the Contractor shall immediately give written notice to the Owner of the cause of such delay.

g. LIQUIDATED DAMAGES

Time is the essence of the contract. The Contractor therefore agrees that the Owner will be entitled to damages for failure on the part of the Contractor to complete the work within the time limits provided for in the contract documents.

Should the Contractor neglect, refuse or otherwise fail to complete the project on or before the specified date, the amount shown in Section 1807 under table 1807.1 in the MN/DOT Specifications dated April 29, 2013 or the most current MN/DOT Specification, shall be deducted from any monies due or coming due to the Contractor or

shall be paid to the owner not as a penalty but as liquidated damages for each and every calendar day or portion thereof that the contract shall remain uncompleted after the specified date for completion, unless otherwise specified in the special provisions of the project specifications. Liquidated damages are specified herein because of the extreme difficulty of ascertaining and establishing the actual damages which the Owner would sustain.

11. MEASUREMENT AND PAYMENT

a. DETAILED BREAKDOWN OF CONTRACT AMOUNT

Except in cases where unit prices form the basis for payment under the contract documents, the Contractor shall, within ten (10) days of receipt of the contract documents, submit an itemized breakdown of the contract amount having the value, including an allowance for profit and overhead, assigned to each part of the work. Unless the breakdown of the contract amount is objected to by the Owner, it shall be used as the basis for all requests for payment.

b. REQUEST FOR PAYMENT

The Contractor may submit periodically, but not more than once each month, at the end of the calendar month, a request for payment for work done and materials delivered and stored on the site. Payment for materials stored on the site will be conditioned on the following:

- i. The Contractor shall submit evidence to establish the Owner's title to such materials, or a lien waiver must be submitted by the supplier.
- ii. Acceptable provisions have been made for storage.
- iii. The Contractor is responsible for all loss, theft, vandalism, storage and similar peril for the full value of the stored material.

Each request for payment shall be itemized and computed as to work completed on all items listed in the detailed breakdown of contract amount less 5% to be retained until 95% of final completion and acceptance of the work, and less previous payments. Where unit prices are specified, the request for payment shall be based on the quantities completed.

After 95% of the work has been completed, the Owner, pursuant to Minnesota Statutes, Section 429.041, Subd. 6, shall upon the request of the Contractor, consider, after receiving the Engineer's recommendation, such portions of the retained price to be released as the Owner's governing body determines are not required to be retained to protect the Owner's interest in satisfactory completion of the contract.

c. ENGINEER'S ACTION ON A REQUEST FOR PAYMENT.

Within ten (10) days of submission of any request for payment by the Contractor, the Engineer shall:

- i. Approve the request for payment as submitted and forward it to the Owner.
- ii. Approve such other amount as he shall consider is due the Contractor informing the Contractor in writing of his reasons for approving the modified amount.
- iii. Withhold the request for payment, informing the Contractor in writing of his reasons for withholding it.

d. OWNER'S ACTION ON AN APPROVED REQUEST FOR PAYMENT

Within 20 days from the date of approval of a request for payment by the Engineer, the Owner shall:

- i. Pay the request for payment as approved by the Engineer.
- ii. Pay such other amount in accordance with Section 11.e as he shall decide is due the Contractor, informing the Contractor and the Engineer in writing of its reasons for paying the modified amount.
- iii. Withhold payment in accordance with Section 11.e informing the Contractor and the Engineer in writing of its reasons for withholding payment.

e. OWNER'S RIGHT TO WITHHOLD PAYMENT

The Owner may withhold payment in whole or in part to the extent necessary to protect itself from loss on account of any of the following causes:

- i. Violation of any of the terms of the contract documents.
- ii. Defective work not remedied.
- iii. Reasonable evidence indicating potential filing of claims by other parties against the Contractor or owner.
- iv. Failure of the Contractor to make payments to Subcontractors, material suppliers.
- v. Damage to the Owner or any other party.

When any of the above grounds for which payment is being withheld is removed, payment shall be made for the amount withheld.

f. INTEREST ON UNPAID REQUESTS FOR PAYMENT

Should the Owner fail to pay an approved request for payment within 30 days from the date of approval by the Engineer, and fail to inform the Engineer and the Contractor in writing of its reasons for withholding payment, the owner shall pay the Contractor interest on the unpaid amount of the request for payment pursuant to Minnesota Statutes Section 429.041, Subdivision 6.

g. PAYMENT FOR REJECTED WORK AND MATERIALS

Should the Owner direct the Contractor to not correct work that has been damaged or that has not been performed in accordance with the contract documents, an equitable deduction from the contract amount shall be made by means of a change order to compensate the Owner for the uncorrected work.

h. PAYMENT FOR REJECTED WORK AND MATERIALS

The removal of work and materials rejected under Section 8.e and the re-execution of acceptable work by the Contractor shall be at the expense of the Contractor, and he shall pay the cost of replacing the work of other Contractors destroyed or damaged by the removal of the rejected work or materials and the subsequent replacement of acceptable work.

Removal of rejected work or materials and storage of materials by the Owner in accordance with Section 8.e shall be paid by the Contractor within 30 days after written notice to pay is given by the owner. If the Contractor does not pay the expenses of such removal

the owner may, after ten (10) days from the giving of written notice to the Contractor of the owner's intent to sell the materials, sell the materials at auction or at private sale and shall pay to the Contractor the net proceeds therefrom after deducting all the costs and expenses that should have been borne by the Contractor.

i. PAYMENT FOR INCREASED OR DECREASED QUANTITIES

Whenever the quantity of any item of work as given in the proposal shall be increased or decreased payment for such item will be made on the basis of actual quantity completed, at the contract unit price for such item. No payment will be made for quantities placed without the prior written approval of the owner.

The Owner reserves the right to increase or decrease, by 25% of the original contract quantity, any of the quantities shown. In the event the actual quantities differ more than 25% of the original contract quantity, an equitable revision of the unit price shall be made when requested by either the Owner or the Contractor. This 25% limit does not apply to items specifically excluded or listed as optional by the Owner, nor to minor contract items (items amounting to 10% or less of the total contract).

j. PAYMENTS FOR EXTRA WORK.

Written notice of claims for payments for extra work shall be given by the Contractor within ten (10) days after receipt of a written order from the owner to proceed with the extra work and also before any work is commenced by the Contractor, except in emergency situations endangering life or property. No claim shall be valid unless so made. In all cases, the Contractor's itemized estimate sheets showing all labor and material shall be submitted to the owner. The Owner's written order for extra work shall specify any extension of the contract time and one of the following methods of payments:

- i. Unit prices or combinations of unit prices which formed the basis of the original contract.
- ii. A lump sum based on the Contractor's estimate, approved by the Engineer and accepted by the owner.
- iii. Actual cost plus overhead and profit as follows:
 1. The "actual cost" shall include labor, materials, and equipment necessary to complete the work as ordered

by the Engineer.

2. The Contractor shall be paid for all labor, and the foreman in direct charge, for every hour they are actually engaged in the force account work. An amount equal to 45% of the sum of the above labor wage items will be paid the Contractor as full compensation for Workmen's Compensation, Social Security, pension and retirement allowances, and insurance, or other regular payroll deductions.
 3. Equipment used, which has authorization by the Engineer, shall be paid for per the equipment rental rates in the Rental Rate Blue Book. The rates shall be paid for the actual time the equipment is in operation on the extra work items. Travel time to and from the job site will be allowed at rental rates when the equipment is moved under its own power. Where transportation is accomplished by other than its own power, the cost of the transport shall be paid for as approved by the Engineer. Equipment rates will have no percentages added to them for overhead or profit.
 4. Materials accepted by the Engineer and used, including transportation costs for delivery but exclusive of machinery rentals as set forth above, will be reimbursed to the Contractor for actual costs plus 15%.
- iv. Notwithstanding any of the foregoing, the Contractor acknowledges and agrees that payment for extra work shall not be paid using the total cost method or modified total cost method calculation.

k. RESPONSIBILITY OF THE CONTRACTOR

Unless specifically noted otherwise, the Contractor shall furnish all materials and services and perform all the work described by the contract documents or shall have all materials and services furnished and all the work performed at his expense. It shall be the Contractor's responsibility to pay for:

- i. Replacement of survey bench marks, reference and stakes provided by the Owner under Paragraph 7.d.
- ii. Lands by Contractor provided in accordance with Paragraph

7.b.

- iii. Insurance obtained in accordance with Paragraph 9.a and 9.b.
- iv. Performance Bond obtained in accordance with Paragraph 9.c.
- v. Royalties required under Paragraph 9.d
- vi. Permits and Licenses required of the Contractor and all Subcontractors.

I. PAYMENT FOR WORK SUSPENDED BY THE OWNER

If the work or any part thereof shall be suspended by the Owner as provided in Section 6.e and abandoned by the Contractor, the Contractor will then be entitled to payment for all work done on the portions so abandoned. No payment will be made for work deleted from the project which has not been started by the Contractor including but not limited to engineering and attorneys' fees.

m. PAYMENT FOR WORK BY THE OWNER

The cost of the work performed by the owner in taking possession of the work and equipment, tools and supplies in accordance with Section 6.g and in correcting deficiencies as provided in Section 6.f shall be paid by the Contractor.

n. PAYMENT FOR WORK BY THE OWNER FOLLOWING OWNER'S TERMINATION OF THE CONTRACT

Upon termination of the contract by the Owner pursuant to Section 6.g, no further payments shall be due the Contractor until the work is completed by the Owner. If the unpaid balance of the contract amount shall exceed the cost of completing the work including all overhead costs, the excess shall be paid to the Contractor. If the cost of completing the work shall exceed the unpaid balance, the Contractor shall pay the difference to the owner. The cost incurred by the Owner, as herein provided, and the damage incurred through the Contractor's default, shall be approved in writing by the Engineer and certified in writing by the Owner.

o. PAYMENT FOR WORK TERMINATED BY THE CONTRACTOR

Upon suspension of the work or termination of the contract by the Contractor pursuant to Section 6.h the Contractor shall recover payments from the Owner for the work performed, plus loss on plant and materials, plus a reasonable profit on work performed.

p. PAYMENT FOR SAMPLES AND TESTING OF MATERIALS

Samples furnished in accordance with Section 5.i shall be furnished by the Contractor at his expense. Testing of samples and materials furnished in accordance with Section 5.i shall be arranged and paid for by the Owner, unless said tests fail, in which case they shall be paid for by the Contractor.

q. REMOVAL OF CONSTRUCTION EQUIPMENT, TOOLS AND SUPPLIES

At the termination of this contract, but before acceptance of the work by the Owner, the Contractor shall remove all of his equipment, tools and supplies from the work site. Should the Contractor fail to remove such equipment, tools, and supplies, the Owner shall have the right to remove them with the cost of such removal to be charged to the Contractor.

r. CLEANING UP

Contractor shall keep the work site free from accumulations of waste materials, rubbish and other debris resulting from the work, and at the completion of the work he shall remove all waste materials, rubbish and debris from and about the work site as well as all tools, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by Owner. Contractor shall restore to their original condition those portions of the site not designated for alteration by the Contract Documents.

s. EXAMINATION OF COMPLETED WORK

If the Owner requests it, the Contractor at any time before acceptance of the work shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering or removing, and the replacing of the covering or making good of the parts removed shall be paid for as

extra work, but should the work so exposed or examined prove unacceptable, the uncovering, removing and replacing shall be at the Contractor's expense.

t. RELEASE OF LIENS

Before any retained amounts are released or final payment is made, the Contractor shall submit with his application for payment to the Owner (1) an affidavit stating all payables, bills for materials and equipment and other indebtedness connected with the work for which the owner or his property might in any way be responsible, have been paid or satisfied; and (2) consent of surety, if any, to final payment. If any Subcontractor or material supplier refuses to furnish releases or receipts in full, Contractor may furnish a bond satisfactory to the Owner to indemnify him against such lien or claim.

u. ACCEPTANCE AND FINAL PAYMENT

When the Contractor has completed the work in accordance with the terms of the contract documents, the Contractor shall request in writing final acceptance and the Engineer shall certify in writing his acceptance and his approval of the Contractor's final request for payment to the Owner, which shall be the contract amount plus all approved modifications, less all approved deductions and less previous payments made.

The City shall accept the project within 60 days after receipt of the Contractor's request in writing or in the alternative notify the Contractor in writing the reasons why the project has not been accepted. The Owner's failure to respond within said 60 day period will be deemed to be acceptance of the project. Acceptance by the City for the purpose of beginning the warranty period will be deemed to be when the project is finally accepted by the Maple Grove City Council; however, in the case of a project which includes both utility improvements and street improvements, the Owner will accept the utility portion of the project upon written request by the Contractor and recommendation of the Project Engineer after the utility portion has been completed and is capable of being put into service by the Owner.

The Contractor shall furnish evidence that he has fully paid all debts for labor, materials and equipment incurred in connection with the work, following which the Owner shall accept the work and release the Contractor except as to the conditions of the performance bond, any legal rights of the Owner, required guarantees, and

correction of faulty work after final payment under Section 11.v and shall authorize payment of the Contractor's final request for payment.

The Contractor must allow sufficient time between the time of completion of the work and approval of the final request for payment to allow the Engineer to assemble and check the necessary data.

No state agency or local unit of government can make final payment to a contractor until the Minnesota Department of Revenue has certified the contractor and any subcontractor(s) have complied with the state's withholding tax laws.

After work on a state or local government construction project is complete, all contractors and subcontractors who worked on the project must complete a Contractor Affidavit. This requirement applies to all projects contracted by Minnesota state agencies and local units of government, including counties, cities and school districts.

You will receive final payment from the state agency or local unit of government only after you submit a Contractor Affidavit and the Department of Revenue verifies you have met Minnesota's withholding requirements.

CERTIFICATE OF COMPLIANCE WITH MINNESOTA STATUTES 290.92 & 270C.66

Upon completion of the project and prior to final payment, the Contractor and all Subcontractors shall complete Minnesota Department of Revenue Form IC-134. This form, Withholding Affidavit for Contractors, must be stamped and dated by the Department of Revenue and forwarded to the City of Maple Grove. Contractor can obtain copies of this form from the City or from the Minnesota Department of Revenue, Mail Station 6501, St. Paul, MN 55146 or by calling 651-282-9999 or 1-800-657-3594 outside the Metro area.

v. CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT

The approval of the final request for payment by the Engineer and the making of the final payment by the Owner to the Contractor shall

not relieve the Contractor of responsibility for faulty materials or workmanship. The Owner shall promptly give written notice to the Contractor of faulty materials or workmanship and the Contractor shall promptly replace any such defects discovered within such time as may be prescribed by law or by the terms of special warranties required by the contract documents. The Engineer shall decide all questions arising under this paragraph.

w. WAIVER OF CLAIM

The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

- i. Unsettled liens or claims;
- ii. Faulty or defective work; or
- iii. Failure of the work to comply with the requirements of the contract documents or the terms of any warranties specified therein.

The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final application for payment.

x. SEVERABILITY

If any provision of this contract is found to not be valid or enforceable, it shall not affect the validity or enforceability of the remaining provisions of the contract.

y. PREVAILING WAGES

In accordance with Minnesota Statutes 177.41 to 177.44 (the "Little Davis-Bacon Law") and Federal Statutes 40 U.S.C., Section 276-1 Davis Bacon Act, prevailing rates shall be paid for work performed as part of any State or Federal Aid project. The Contractor shall submit an affidavit indicating conformance to this Statute before any payment is made on the contract. Weekly certified payroll forms shall be submitted as the project progresses.

z. TARGETED GROUP BUSINESS (TGB)

State Aid projects over \$300,000.00 shall meet State of Minnesota Targeted Group Business (TGB) Statutes.

aa. PROMPT PAYMENT TO SUBCONTRACTORS

In accordance with Minnesota Statutes 471.425, each contract of a municipality must require the prime Contractor to pay any Subcontractor within ten (10) days of the prime Contractor's receipt of payment from the municipality for undisputed services provided by the Subcontractor. The contract must require the prime Contractor to pay interest of 1-1/2 percent per month or any part of a month to the Subcontractor on any undisputed amount not paid on time to the Subcontractor. The minimum monthly interest penalty payment for an unpaid balance of \$100 or more is \$10. For an unpaid balance of less than \$100, the prime Contractor shall pay the actual penalty due to the Subcontractor. A Subcontractor who prevails in a civil action to collect interest penalties from a prime Contractor must be awarded its costs and disbursements, including attorney's fees, incurred in bringing the action.

[End of Conditions of the Contract]

EXHIBIT A
ADVERTISEMENT FOR BIDS
CITY PROJECT NO. _____
MAPLE GROVE, MINNESOTA
BIDS CLOSE:
TELEPHONE: 763-494-6000

Sealed bids will be received by the City of Maple Grove, Minnesota in the City Hall at 12800 Arbor Lakes Parkway until _____ on _____, _____, at which place and time they will be publicly opened by two or more persons who have been designated by the City to open bids. Bids are for the furnishing of labor and materials and all else necessary for improvements, consisting primarily of the following estimated quantities:

Plans and specifications, proposal forms and contract documents may be seen at the office of the City Clerk, Maple Grove, Minnesota.

Each bid shall be accompanied by a bidder's bond naming the City of Maple Grove as obligee, certified check payable to the Clerk of the City of Maple Grove or a cash deposit equal to at least five percent (5%) of the amount of the bid, which shall be forfeited to the City in the event that the bidder fails to enter into a contract.

Payment for the work will be by cash or check.

Contractors, subcontractors or material suppliers desiring a copy of the plans and specifications and proposal forms may obtain them from the office of the City Clerk, Maple Grove, Minnesota.

All bidders for this contract, including subcontractors and suppliers which have 40 or more full-time employees, shall submit a certified copy of their current Affirmative Action Declaration with their bid.

The Council reserves the right to reject any and all bids, to waive irregularities and informalities therein and further reserves the right to award the contract to the best interests of the City.

City Clerk
City of Maple Grove, Minnesota
Published in the Osseo-Maple Grove Press: _____
Published in the Finance and Commerce: _____

EXHIBIT B

**AFFIDAVIT AND INFORMATION
REQUIRED OF BIDDER**

Affidavit of Non-Collusion:

I hereby swear (or affirm) under the penalty for perjury:

- (1) That I am the bidder (if the bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
- (2) That the attached bid or bids have been arrived at by the bidder independently, and have been submitted without collusion with, and without any agreement, understanding, or planned common course of action with, any other vendor of materials, supplies, equipment or services described in the invitation to bid, designed to limit independent bidding or competition;
- (3) That the contents of the bid or bids have not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids, and will not be communicated to any such person prior to the official opening of the bid or bids; and
- (4) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: _____

Firm Name: _____

Subscribed and sworn to before this ____ day of _____, ____.

Notary Public: _____

My Commission Expires: _____

Bidder's E.I. Number

(Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941): _____

EXHIBIT C

CITY OF MAPLE GROVE

AFFIRMATIVE ACTION QUESTIONNAIRE

CITY PROJECT NO. _____

Please complete the questionnaire shown below and attach this sheet to the bid proposal. This sheet along with the Affirmative Action Certificate should be submitted with the bid. Failure to do so may cause the bid to be rejected.

I hereby certify that I have reviewed the Affirmative Action requirements as set forth in the specifications and declare the following (check one):

☐

We have fewer than 40 employees and are therefore exempt from the Affirmative Action requirement.

or

☐

We have attached a certified copy of our Affirmative Action Certification.

or

☐

We do not have a Certificate.

Name

EXHIBIT D



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER John Smith Agency 123 Main Street Maple Grove, MN 55311		CONTACT NAME: _____ PHONE (A/C, No, Ext): _____ FAX (A/C, No): _____ E-MAIL ADDRESS: _____ INSURER(S) AFFORDING COVERAGE INSURER A: Any Insurance Company INSURER B: _____ INSURER C: _____ INSURER D: _____ INSURER E: _____ INSURER F: _____	
INSURED ABC Construction 456 Main Street Maple Grove, MN 55311		NAIC # _____	

COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADD'L SUBR INSR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	GENERAL LIABILITY <input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> BLKT ADD'L INSD ENDT. <input checked="" type="checkbox"/> 5,000 PD DEDUCTIBLE GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC					EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000 Employee Benefit Liability \$ 1,000,000
	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> ALL OWNED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> NON-OWNED AUTOS					COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 10,000					EACH OCCURRENCE \$ 10,000,000 AGGREGATE \$ 10,000,000 \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	N/A			<input checked="" type="checkbox"/> WC STATUTORY LIMITS <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ 500,000 E.L. DISEASE - EA EMPLOYEE \$ 500,000 E.L. DISEASE - POLICY LIMIT \$ 500,000
	CONTRACTORS EQUIPMENT BLDG RISK OR INSTALLATION					Leased/Rented Equipment \$300,000 Any 1 Loc/In Transit or Project \$500,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

PROJECT: (INSERT PROJECT NAME HERE) CITY PROJECT NUMBER: (INSERT CITY PROJECT NUMBER HERE)
 CITY OF MAPLE GROVE, (INSERT CONSULTING SERVICES COMPANY HERE), AND THEIR CONSULTANTS, AND EACH OF THEIR OFFICERS, EMPLOYEES, AND AGENTS, AS WELL AS ANY OTHER PERSON WITH AN INSURABLE INTEREST DESIGNATED BY THE OWNER ARE LISTED AS ADDITIONAL INSURED IN REGARDS TO GENERAL LIABILITY, AUTO LIABILITY, AND UMBRELLA WHEN REQUIRED BY WRITTEN CONTRACT PER FORMS CGD604, CAT353 03/10, AND CGT804. 30 DAY NOTICE OF CANCELLATION APPLIES, 10 DAY NOTICE FOR NON-PAYMENT OF PREMIUM.

CERTIFICATE HOLDER

CANCELLATION

CITY OF MAPLE GROVE 12800 ARBOR LAKES PARKWAY MAPLE GROVE, MN 55311-6180	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
--	---

© 1988-2010 ACORD CORPORATION. All rights reserved.

ACORD 25 (2010/05)

The ACORD name and logo are registered marks of ACORD

Clear All

EXHIBIT E

CONTRACTOR'S PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that _____ as Principal, hereinafter called CONTRACTOR, and _____ as Surety, hereinafter called Surety, are held and firmly bound onto _____ as Obligee, hereinafter called OWNER, for the use and benefit of claimants as hereinafter provided in the amount of _____ Dollars (written), (\$_____), for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has by written Agreement dated _____, _____, entered into a Contract with OWNER for _____ in accordance with plans and specifications prepared by _____ which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if CONTRACTOR shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and shall keep the project free and clear of all liens as provided in the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. Claimant is defined as one permitted by applicable law to file a Public Contractor's Bond claim for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include without limitation that part of water, gas, power, light, heat, oil, gasoline, telephone service, rental of equipment, insurance premiums, taxes, and any items for which a claim or lien may be filed against the Obligee under the applicable law.
2. The above named Contractor and Surety hereby jointly and severally agree with the Obligee that every claimant as herein defined, who has not been paid in full may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sums as may be justly due claimant, and have execution thereon. The Obligee shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:

- a. Unless claimant has filed a public contractor's bond claim in the form and with the time provided under applicable law, or
 - b. After expiration of time for enforcement of a public contractor's bond claim by legal action.
4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder.
5. The Contractor and Surety shall keep the project free and clear of liens and shall promptly remove any and all liens filed against the project by claimants.
6. The Obligee's right of action on this bond, or for the breach thereof, shall not be limited by the conditions set forth in paragraphs 1 through 3 above.

Contractor

By _____
Signature

Printed Name of Signer

Title

Witness

By _____
Signature

Printed Name of Signer

Title

(If the Contractor is a partnership or joint venture, all partners or co-venturers must execute this Bond.

(If the Contractor is a partnership or joint venture, all partners or co-venturers must execute this Bond.)

Surety

Address

Phone No.

Witness

By _____
Signature

(Printed name of signer)

Title

Local address & telephone number

(The attorney-in-fact shall attach hereto a copy of this power of attorney, or other documents, which authorizes him to act on behalf of and to bind the surety.)

Mayor

City Administrator

Date

CERTIFICATE OF ACKNOWLEDGMENT BY PRINCIPAL
(For use where Contractor is individual or partnership)

STATE OF MINNESOTA)
) §§
COUNTY OF _____)

On this _____ day of _____, ___, before me personally appeared _____, to me known to be the person__ described in and who executed the foregoing bond, and acknowledge that _he__ executed the same as free act and deed of the individual.

(NOTARIAL SEAL)

Notary Public

CERTIFICATE OF ACKNOWLEDGMENT
(For use where Contractor is a corporation)

STATE OF MINNESOTA)
) SS
COUNTY OF _____)

On this _____ day of _____, ___, before me personally appeared _____ and _____ to me personally known who, being by me duly sworn, did say that they are respectively the _____ and _____ of _____ and that said instrument was executed in behalf of the corporation by authority of its Board of Directors, and said _____ and _____ acknowledged the instrument to be the free act and deed of said corporation.

(NOTARIAL SEAL)

Notary Public

Full Name & Address of Surety Company's Home Office

Full Name, Address, Phone & Contact Person of Local Bond Agency

If this bond is executed outside of the State of Minnesota, it must be countersigned on the Performance Bond by a Minnesota resident agent of the Surety Company.

Name & Address of Agent affixing countersignature

MEMORANDUM: Affix here Power of Attorney and Acknowledgment of Corporate surety.

EXHIBIT F

CONTRACTOR'S PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal, hereinafter called CONTRACTOR, and _____ as Surety, hereinafter called Surety, are held and firmly bound onto the City of Maple Grove as Owner, hereinafter called OWNER, in the amount of _____ Dollars (written), (\$_____), for the payment whereof CONTRACTOR and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS,

CONTRACTOR has by written Agreement dated _____, _____ entered into a Contract with OWNER for construction of _____ in accordance with Contract Documents prepared as by _____, which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION, is such that, if CONTRACTOR shall promptly and faithfully perform said Contract in conformance with the Contract Documents, and all guaranty, indemnity and warranty obligations specified therein, and shall promptly and faithfully remedy any breach of its obligations under the Contract Documents discovered with the time limits set by statute for commencement of actions, and shall pay any damages for unexcused late completion, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time by OWNER.

Whenever CONTRACTOR shall be, and declared by OWNER to be, in default under the Contract, the OWNER having performed OWNER's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions, or
2. Obtain a Bid or Bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety jointly of the lowest responsible bidder, arrange for a Contract between such bidder and Surety, and Surety shall pay such bidder pursuant to such Contract, while the Owner shall pay the Surety the cost of completion, up to the cost of completion, up to, but not exceeding, the balance of the contract price. The term "balance of the Contract Price", as used in this paragraph, shall mean the total amount payable by OWNER to CONTRACTOR under the Contract and any amendments thereto, less the amount properly paid by the OWNER to CONTRACTOR.

3. Promptly pay such items to the Owner as the Owner may be entitled from the Contractor under the Contract Documents, or for the breach thereof, but not exceeding the amount set forth in the first paragraph hereof.

The surety agrees to be bound by any award granted to the Owner against the Contractor in arbitration or judicial proceedings commenced pursuant to the Contract Documents.

No right of action shall accrue on this bond to or for the use of any person or corporation other than OWNER named herein or the heirs, executors, administrators or successors of OWNER.

Signed this _____ day of _____, ____.

Contractor

By_____
Signature

Printed Name of Signer

Title

Witness

By_____
Signature

Printed Name of Signer

Witness

Title

(If the Contractor is a partnership or joint venture, all partners or co-venturers must execute this Bond.)

Surety

Address

Phone No.

Witness

By _____
Signature

Printed name of signer

Title

Local address & telephone number

(The attorney-in-fact shall attach hereto a copy of this power of attorney, or other documents, which authorizes him to act on behalf of and to bind the surety.)

Mayor

City Administrator

Date

CERTIFICATE OF ACKNOWLEDGMENT BY PRINCIPAL
(For use where Contractor is individual or partnership)

STATE OF MINNESOTA)
) §§
COUNTY OF _____)

On this _____ day of _____, ___, before me personally appeared _____, to me known to be the person__ described in and who executed the foregoing bond, and acknowledge that _he__ executed the same as free act and deed of the individual.

(NOTARIAL SEAL)

Notary Public

CERTIFICATE OF ACKNOWLEDGMENT
(For use where Contractor is a corporation)

STATE OF MINNESOTA)
) SS
COUNTY OF _____)

On this _____ day of _____, ___, before me personally appeared _____ and _____ to me personally known who, being by me duly sworn, did say that they are respectively the _____ and _____ of _____ and that said instrument was executed in behalf of the corporation by authority of its Board of Directors, and said _____ and _____ acknowledged the instrument to be the free act and deed of said corporation.

(NOTARIAL SEAL)

Notary Public

Full Name & Address of Surety Company's Home Office

Full Name, Address, Phone & Contact Person of Local Bond Agency

If this bond is executed outside of the State of Minnesota, it must be countersigned on the Performance Bond by a Minnesota resident agent of the Surety Company.

Name & Address of Agent affixing countersignature

MEMORANDUM: Affix here Power of Attorney and Acknowledgment of Corporate surety.

EXHIBIT G
FORM OF AGREEMENT

THIS AGREEMENT, entered into this _____ day of _____, _____, between the City of Maple Grove, hereinafter called the "Owner" and _____ hereinafter called the "Contractor".

THIS AGREEMENT WITNESSETH, that the Owner and the Contractor, for the consideration hereinafter stated, agree as follows:

ARTICLE I. The Contractor hereby covenants and agrees to perform and execute all the provisions of the plans and specifications as prepared by The City of Maple Grove - Engineering Department, and indicated below under Article IV, as provided by the Owner for:

_____ and to do everything required by this agreement and the contract documents.

ARTICLE II. The Contractor agrees that the work contemplated by this contract shall be fully and satisfactorily completed on or before _____.

ARTICLE III. The Owner agrees to pay and the Contractor agrees to receive and accept payment in accordance with the prices bid for the unit or lump sum items as set forth in the conformed copy of Proposal Form hereto attached, which prices shall conform to those in the accepted Contractor's Proposal Form on file in the Office of the City Clerk, City of Maple Grove, the aggregate of which prices, based on the approximate schedule of quantities, is estimated to be \$_____.

Monthly and final payment shall be made as provided in the City's Standard Specifications for Utility and Street Construction referred to herein.

ARTICLE IV. The contract documents shall consist of the following component parts:

1. Advertisement for Bids
2. Instruction for Bidders
3. Standard Specifications for Utility & Street Construction dated 2015, Maple Grove.
4. Special Provisions of the Project Specifications.
5. Proposal Form.
6. Performance and Payment Bond.
7. Plans and drawings which are attached to the specifications or which are identified as Sheets 1 through _____ for:
8. Addenda No. _____ through _____.

9. This Agreement

Each and all of the aforementioned contract documents are hereby incorporated into this agreement by specific reference and the terms and provisions thereof are and constitute a part of this Agreement as though attached hereto or fully set forth herein.

IN WITNESS WHEREOF, the parties to this Agreement have hereunto set their hands as of the day and year first above written.

CITY OF MAPLE GROVE

By _____
Mayor

And _____
City Administrator

(Construction Company)

By _____

And _____

CERTIFICATE OF ACKNOWLEDGEMENT

STATE OF MINNESOTA)
COUNTY OF HENNEPIN) SS.
CITY OF MAPLE GROVE)

The foregoing Contract was acknowledged before me this _____ day of _____, 20____, by the Mayor and City Administrator of the CITY OF MAPLE GROVE, a Minnesota municipal corporation, on behalf of said corporation.

STATE OF MINNESOTA)
COUNTY OF HENNEPIN) SS.
CITY OF _____)

The foregoing Contract was acknowledged before me this _____ day of _____, 20____ by _____ and _____ of _____ on behalf of said corporation. (Company Name)

CERTIFICATE OF ACKNOWLEDGMENT
(For use where Contractor is individual or partnership)

STATE OF MINNESOTA)
) §§
COUNTY OF)

On this _____ day of _____, 20____, before me personally appeared _____, to me known to be the person___ described in and who executed the foregoing instrument and acknowledge that____he executed the same as free act and deed of the individual.

(NOTARIAL SEAL)

Notary Public

CERTIFICATE OF ACKNOWLEDGMENT
(For use where Contractor is a corporation)

STATE OF MINNESOTA)
) §§
COUNTY OF)

On this _____ day of _____, 20____, before me personally appeared _____ and _____, to me personally known to be the _____ and _____, respectively, of _____, and that said instrument was executed in behalf of the corporation by authority of its _____ and said _____ and _____ acknowledged the instrument to be the free act and deed of the corporation.

(NOTARIAL SEAL)

Notary Public

EXHIBIT H
INFORMATION FOR BIDDERS

1. BID PROCEDURE:

Each Contractor has been furnished a specification, and one (1) extra proposal form. The Contractor shall submit a copy of his bid on the separate proposal form. A sealed envelope shall contain the two proposals.

2. PLAN PURCHASE:

A. Prime Contractor: A Prime Contractor may obtain a set of plans and specifications for purchase as stipulated in the Advertisement for Bids. The "City of Maple Grove, Standard Specifications for Utility and Street Construction, 2016", is not included in the plan purchase; however, it is available for purchase at the Maple Grove Government Center or from the City's website.

A Prime Contractor is defined as a general contractor who submits a bona fide bid or an electrical or mechanical subcontractor who provided a complete sub-bid to more than one general contractor. A bid for equipment or material only is not considered a complete sub-bid.

Prime Contractors may obtain more than one set of plans and specifications if necessary.

B. Material Supplier or Subcontractor: Any material supplier or subcontractor may obtain one (1) set of plans and specifications for a purchase as stipulated in the Advertisement for Bids.

Individual drawings and sections of the specifications may be purchased at a rate of three dollars and fifty cents (\$3.50) per sheet of drawings and twenty-five cents (\$0.25) per sheet of specifications for which no refund shall be made.

4. QUALIFICATION OF BIDDER: The Owner may request the bidder to submit information necessary to satisfy the owner that the bidder is adequately prepared to fulfill the contract. Such information may include past performance records, list of available personnel, plant, equipment, financial statement or any other pertinent information.

PROPOSAL FORM

EXHIBIT I
Contractor: _____

P R O P O S A L F O R
CITY PROJECT NO. _____

MAPLE GROVE, MINNESOTA

OPENING TIME: _____

OPENING DATE: _____

Honorable City Council
City of Maple Grove
P.O. Box 1180
12800 Arbor Lakes Parkway
Maple Grove, MN 55311

Gentlemen:

The undersigned, being familiar with your local conditions, having made the field inspections and investigations deemed necessary, having studied the plans and specifications for the work including Addenda Nos. _____ and being familiar with all factors and other conditions affecting the work and cost thereof, hereby proposes to furnish all labor, tools, materials, skills, equipment and all else necessary to completely construct the project in accordance with the plans and specifications on file with the City Clerk and City Engineer, P.O. Box 1180, 12800 Arbor Lakes Parkway, Maple Grove, MN 55311 as follows:

PROPOSAL FORM

The final amount of the contract shall be determined by multiplying the final measured quantities of the various items actually constructed and installed by the unit prices stated therefore, in the manner prescribed in the specifications. However, the low bidder shall be determined by adding the sums resulting from multiplying the quantities stated by the unit prices bid therefore.

Accompanying this bid is a bidder's bond, certified check or cash deposit in the amount of at least five percent (5%) of the amount of the bid made payable to the City of Maple Grove and the same is subject to forfeiture in the event of default on the part of the undersigned or failure on the part of the undersigned to execute the prescribed contract within fifteen (15) days of receiving the contract.

In submitting this bid, it is understood that the Owner retains the right to reject any and all bids and to waive irregularities and informalities therein, and to award the contract in the best interests of the Owner.

It is understood that bids may not be withdrawn for a period of time after the date and time set for the opening of bids. It is understood that the Owner reserves the right to retain the certified check or bond of the three (3) lowest bidders as determined by the Owner for a period of 30 days after the date set for the opening of bids.

Respectfully submitted,

By:_____

Title:_____

(A Corporation)
(An Individual)
(A Partnership)

Bidder's E. I. Number (Number used on Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941):_____

EXHIBIT J

CARING FOR YOUR NEW SOD FACT SHEET -2016

Crews will soon begin to restore the sod on the project. Care must be taken in order that it survives. We ask for your assistance to help ensure the sod receives adequate water and maintenance. Please avoid walking on your new sod for the first two weeks. The combined efforts of you and the contractor should result in a healthy, vigorous lawn. Please follow the information below.

WATERING

Please begin watering your new sod as soon as it has been placed. Your efforts, when combined with the contractor watering the sod for the required 30-day maintenance period, will help ensure the sod will grow and your lawn looking its best. After the initial 30-day sod maintenance period, it will be entirely up to you to water the sod. **Neither the contractor nor the City of Maple Grove will be responsible for replacing dead sod after the initial 30-day growing period.** Your actions will be especially important if there is little rainfall and hot temperatures. The rule of thumb for watering mature lawns is a minimum of 1 inch per week. **New sod requires twice as much water, or 2 inches per week done in 3 or 4 applications.** More frequent, lighter watering is not desirable. They encourage shallow roots instead of deep roots. Lawns need deep roots to help them withstand periods of little or no rain. During extended hot and dry periods, new sod should be thoroughly soaked every day. Checking to see if you are watering enough is done by placing a shallow, flat-bottomed container under the sprinkler. Then just measure the water depth in the container. *Any rainfall received during the week can be included in your 2 inches a week watering total.* You should continue watering the new sod for the remainder of the fall until the first few frost events.

MOWING AND FERTILIZING

Do not mow your newly placed sod for 3 weeks. This is the only method by which your sod will develop deep roots. Your new sod should not be mowed until either the grass lies over and mats down when wetted, or the grass goes to seed. Don't be alarmed if either of these conditions does not occur in the first 30 days. **Prior to mowing, set the mower deck at the highest setting and cut the new sod with this setting for the first several months. Your new sod may die if you cut it at the same setting as the one you ordinarily use to cut your mature lawn.**

Your new sod was fertilized at the place it was grown; therefore, it will not need fertilizer until next summer. **If you fertilize sooner, you risk killing the sod.** When you do fertilize for fall, remember to use a phosphorus-free fertilizer (i.e. 15-0-0, middle number is phosphorous and should be zero) and follow the manufacturer's instructions on application rates.

FUTURE MAINTENANCE

Remember, even after you new sod appears to have taken hold; it is not as sturdy as an established lawn. It takes a while for the roots to reach their mature length. Until the roots are mature, the sod is still susceptible to dry conditions. Remember to water deeply. It is also advisable to let the sod grow a little longer than normal when conditions are dry. Fertilize as described above if the sod begins to yellow.

EXHIBIT K

ATTACHMENT A

RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

PROJECT # _____

Minn. Stat. § 16C.285, Subd. 7. **IMPLEMENTATION.** ... any prime contractor or subcontractor that does not meet the minimum criteria in subdivision 3 or fails to verify that it meets those criteria is not a responsible contractor and is not eligible to be awarded a construction contract for the project or to perform work on the project...

Minn. Stat. § 16C.285, Subd. 3. **RESPONSIBLE CONTRACTOR, MINIMUM CRITERIA.** "Responsible contractor" means a contractor that conforms to the responsibility requirements in the solicitation document for its portion of the work on the project and verifies that it meets the following minimum criteria:

- | | |
|-----|---|
| (1) | <p>The Contractor:</p> <ul style="list-style-type: none">(i) is in compliance with workers' compensation and unemployment insurance requirements;(ii) is currently registered with the Department of Revenue and the Department of Employment and Economic Development if it has employees;(iii) has a valid federal tax identification number or a valid Social Security number if an individual; and(iv) has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative. |
| (2) | <p>The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 177.24, 177.25, 177.41 to 177.44, 181.13, 181.14, or 181.722, and has not violated United States Code, title 29, sections 201 to 219, or United States Code, title 40, sections 3141 to 3148. For purposes of this clause, a violation occurs when a contractor or related entity:</p> <ul style="list-style-type: none">(i) repeatedly fails to pay statutorily required wages or penalties on one or more separate projects for a total underpayment of \$25,000 or more within the three-year period;(ii) has been issued an order to comply by the commissioner of Labor and Industry that has become final;(iii) has been issued at least two determination letters within the three-year period by the Department of Transportation finding an underpayment by the contractor or related entity to its own employees;(iv) has been found by the commissioner of Labor and Industry to have repeatedly or willfully violated any of the sections referenced in this clause pursuant to section 177.27;(v) has been issued a ruling or findings of underpayment by the administrator of the Wage and Hour Division of the United States Department of Labor that have become final or have been upheld by an administrative law judge or the Administrative Review Board; or(vi) has been found liable for underpayment of wages or penalties or misrepresenting a construction worker as an independent contractor in an action brought in a court having jurisdiction. Provided that, if the contractor or related entity contests a determination of underpayment by the Department of Transportation in a contested case proceeding, a violation does not occur until the contested case proceeding has concluded with a determination that the contractor or related entity underpaid wages or penalties;* |

(3)	The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 181.723 or chapter 326B. For purposes of this clause, a violation occurs when a contractor or related entity has been issued a final administrative or licensing order;*
(4)	The contractor or related entity has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under section 363A.36 revoked or suspended based on the provisions of section 363A.36, with the revocation or suspension becoming final because it was upheld by the Office of Administrative Hearings or was not appealed to the office;*
(5)	The contractor or related entity has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting the verification;*
	* Any violations, suspensions, revocations, or sanctions, as defined in clauses (2) to (5), occurring prior to July 1, 2014, shall not be considered in determining whether a contractor or related entity meets the minimum criteria.
(6)	The contractor or related entity is not currently suspended or debarred by the federal government or the state of Minnesota or any of its departments, commissions, agencies, or political subdivisions; and
(7)	All subcontractors that the contractor intends to use to perform project work have verified to the contractor through a signed statement under oath by an owner or officer that they meet the minimum criteria listed in clauses (1) to (6).

Minn. Stat. § 16C.285, Subd. 5. **SUBCONTRACTOR VERIFICATION.**

A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project.

If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors.

A prime contractor shall submit to the contracting authority upon request copies of the signed verifications of compliance from all subcontractors of any tier pursuant to subdivision 3, clause (7). A prime contractor and subcontractors shall not be responsible for the false statements of any subcontractor with which they do not have a direct contractual relationship. A prime contractor and subcontractors shall be responsible for false statements by their first-tier subcontractors with which they have a direct contractual relationship only if they accept the verification of compliance with actual knowledge that it contains a false statement.

Minn. Stat. § 16C.285, Subd. 4. **VERIFICATION OF COMPLIANCE.**

A contractor responding to a solicitation document of a contracting authority shall submit to the contracting authority a signed statement under oath by an owner or officer verifying compliance with each of the minimum criteria in subdivision 3 at the time that it responds to the solicitation document.

A contracting authority may accept a sworn statement as sufficient to demonstrate that a contractor is a responsible contractor and shall not be held liable for awarding a contract in reasonable reliance on that statement. Failure to verify compliance with any one of the minimum criteria or a false statement under oath in a verification of compliance shall render the prime contractor or subcontractor that makes the false statement ineligible to be awarded a construction contract on the project for which the verification was submitted.

A false statement under oath verifying compliance with any of the minimum criteria may result in termination of a construction contract that has already been awarded to a prime contractor or subcontractor that submits a false statement. A contracting authority shall not be liable for declining to award a contract or terminating a contract based on a reasonable determination that the contractor failed to verify compliance with the minimum criteria or falsely stated that it meets the minimum criteria.

CERTIFICATION

By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:

- 1) My company meets each of the Minimum Criteria to be a responsible contractor as defined herein and is in compliance with Minn. Stat. § 16C.285,
- 2) I have included Attachment A-1 with my company's solicitation response, and
- 3) if my company is awarded a contract, I will also submit Attachment A-2 as required.

Authorized Signature of Owner or Officer:	Printed Name:
Title:	Date:
Company Name:	

Sworn to and subscribed before me this
_____ day of _____, 20____,

Notary Public

My Commission Expires: _____

PLACE NOTARY SEAL HERE

NOTE: Minn. Stat. § 16C.285, Subd. 2, (c) If only one prime contractor responds to a solicitation document, a contracting authority may award a construction contract to the responding prime contractor even if the minimum criteria in subdivision 3 are not met.

ATTACHMENT A-1

FIRST-TIER SUBCONTRACTORS LIST

SUBMIT WITH PRIME CONTRACTOR RESPONSE

PROJECT # _____

Minn. Stat. § 16C.285, Subd. 5. A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project. Submit this form to biddocsubmittal.dot@state.mn.us.

FIRST TIER SUBCONTRACTOR NAMES (Legal name of company as registered with the Secretary of State)	Name of city where company home office is located

ATTACHMENT A-2

ADDITIONAL SUBCONTRACTORS LIST

PRIME CONTRACTOR TO SUBMIT AS SUBCONTRACTORS ARE ADDED TO THE PROJECT

PROJECT # _____

This form must be submitted to the Project Manager or individual as identified in the solicitation document.

Minn. Stat. § 16C.285, Subd. 5. ... If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors. Submit this form to biddocsubmittal.dot@state.mn.us.

ADDITIONAL SUBCONTRACTOR NAMES (Legal name of company as registered with the Secretary of State)	Name of city where company home office is located

ADDITIONAL SUBCONTRACTOR NAMES (Legal name of company as registered with the Secretary of State)	Name of city where company home office is located

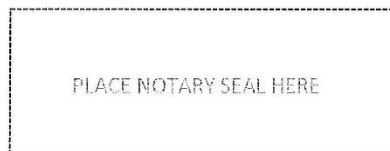
SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-2	
<p>By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:</p> <p>All additional subcontractors listed on Attachment A-2 have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria to be a responsible contractor as defined in Minn. Stat. § 16C.285.</p>	
Authorized Signature of Owner or Officer:	Printed Name:
Title:	Date:
Company Name:	

Sworn to and subscribed before me this
 _____ day of _____, 20____,

 Notary Public

My Commission Expires: _____

Rev. 1-28-2015



GENERAL SPECIFICATIONS

CITY OF MAPLE GROVE, MINNESOTA

TABLE OF CONTENTS JANUARY 2016

TABLE OF CONTENTS	PAGE #
SECTION 1 – GENERAL	1
SECTION 2 – LOCATION	1
SECTION 3 – SCOPE OF WORK	1
SECTION 4 – METHOD OF PROCEDURE	1
SECTION 5 – COORDINATION OF WORK	2
SECTION 6 – CONTRACTOR'S RESPONSIBILITY FOR MATERIALS	2
SECTION 7 – CONSTRUCTION STAKES, ALIGNMENT AND GRADE	4
SECTION 8 – UNDERGROUND, SURFACE AND OVERHEAD UTILITIES	5
SECTION 9 – PRIVATE PROPERTY PROTECTION	5
SECTION 10 – EXCAVATION AND TRENCH PREPARATION	5
SECTION 11 – BACKFILLING	7
SECTION 12 – PIPE FOUNDATIONS	10
SECTION 13 – PUMPING, BAILING AND DEWATERING	10
SECTION 14 – ROCK FOUNDATION	10
SECTION 15 – UNFORSEEN UNDERGROUND OBSTRUCTIONS	11
SECTION 16 – TEMPORARY BRIDGES AND CROSSINGS	11
SECTION 17 – RAILROAD AND HIGHWAY CROSSINGS	11
SECTION 18 – QUALITY SERVICE LOCATES	12
SECTION 19 – RESTORATION OF GROUND AND ROAD SURFACES	13
SECTION 20 – WORKMANSHIP AND CLEANUP	13
SECTION 21 – METHODS OF MEASUREMENT AND PAYMENT	13

- This page left intentionally blank -

GENERAL SPECIFICATIONS

CITY OF MAPLE GROVE, MINNESOTA

1) GENERAL

The General Specification and the Special Provisions and Conditions of the Contract as embodied in these Contract Documents shall be applied to all work and materials to be furnished and installed under these specifications.

2) LOCATION

The General work and appurtenances to be constructed and installed under this contract are located in the City of Maple Grove, Hennepin County, Minnesota, as shown on the drawings.

3) SCOPE OF WORK

The work to be done under this contract shall include the furnishing of all material, labor, tools, and equipment to construct, complete in place, the general work described in connection with water main, sewers and all appurtenances as shown on the drawings and as specified herein and in accordance with all pertinent requirements include but not limited to, the Minnesota Pollution Control Agency and Minnesota Department of Health.

4) METHOD OF PROCEDURE

The Contractor shall perform work in such a manner as to cause the least interference and delay to such other work as may be in progress at the time by other Contractors. The Contractor shall notify the Engineer in writing of his/her intentions to commence work at least five (5) days prior to moving onto the site.

Prior to the start of any work, the Contractor shall submit in writing to the Engineer a schedule of procedure and shop drawing submittals.

5) COORDINATION OF WORK

The Contractor shall be responsible for the satisfactory coordination of the construction with other construction and activities in the area affected. Delays in work resulting from lack of harmony shall not in any way be a cause for extra compensation by any of the parties.

6) CONTRACTOR'S RESPONSIBILITY FOR MATERIALS

a. MATERIAL HANDLING

Pipe and accessories shall, unless directed in the special provisions, be unloaded at the point of delivery, hauled to and distributed at the site of the project. Handle with care to avoid damage.

b. MATERIAL FURNISHED BY CONTRACTOR

The Contractor shall be responsible for material furnished by him, and replace at his own expense material that is found to be defective in manufacture or that has become damaged in handling after delivery by the manufacturer. This shall include the furnishing of material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work or during the warranty period.

c. MATERIAL FURNISHED BY THE OWNER

Responsibility for material furnished by the Owner shall begin at the point of delivery by the manufacturer, or Owner, and acceptance of the material by the Contractor. Examine material furnished by the Owner at the time and place of delivery and reject defective material. The point of delivery shall be stated in the special provisions.

d. QUALITY AND WORKMANSHIP

The Owner or the Engineer may request certified lab data from the Manufacturer to verify the physical properties of the materials supplied under this specification or at his own expense may take random samples for testing by an independent laboratory.

QA Deviations – If an approved supplier must supply material that does not meet all requirements of this specification, he must notify the Engineer via a written description of the deviation with data that

shows the magnitude of the deviation, the justification for the deviation from this specification, and the worst case, long term impact of the deviation on the project. The decision to accept material deviating from this specification prior to shipment shall be the responsibility of the Engineer.

Compaction testing will be performed for the Owner by an independent testing laboratory (Northern Technologies, Inc.) The cost of passing tests will be paid by the Owner and the Contractor shall pay for all failing test and the retest.

The provisions of MnDOT 1603 and the most current version of the MnDOT Schedule of Materials Control will be the basis for all Quality Control testing performed by the Contractor as part of the Contract Work. In addition, the following testing rates and requirements will be utilized for street and utility construction work as part of Quality Assurance testing by the Owner and shall be performed by Northern Technologies Inc. (NTI). NTI can be contacted at (763) 433-9175

Bituminous Testing				
Testing Location	Project Type	Sampling Responsibility	QA Testing Frequency	Reference Specification
Mix Sampling – Field / Placement	All Projects	Owner's Testing Representative ¹	1 per day per mix design	MnDOT 2360
All Courses Below Wear – Maximum Density Specification	All Projects	Owner Marks Core Location, Contractor Performs Coring	Varies Based on Tonnage	MnDOT 2360.3.D.1
Wear Course – Ordinary Compaction	All Projects	Owner's Testing Representative ¹	Varies Based on Tonnage	MnDOT 2360.3.D.2

¹ For samples at plant and in the field, the Contractor may be requested to take companion sample for Owner's testing. Owner will provide containers for sampling.

Trench Backfill Density				
Location / Depth	Proctor Type	Min % Compaction	QA Testing Frequency	Reference Specification
Outside Road Core	Standard	95%	1 per 500' of Trench	MnDOT 2105.3
Road Core ≤ below grading grade (bottom of aggregate base)	Standard	100%	1 per 250' of Trench	MnDOT 2105.3
Road Core, > 3' below grading grade	Standard	95%	1 per 500' of Trench	MnDOT 2105.3

Select Granular / Stabilizing Aggregate / Aggregate Base					
Location / Use	Gradation	Test Type	Min % Compaction	QA Compaction Testing Frequency	Reference Specification
Select Granular Borrow	1 per Source	Specified Density	100%	1 per 250' of Roadway	MnDOT 2105.3
Aggregate Base	1/12,000 yd ²	DCP – Penetration Index Method	See Specification	1 per 250' of roadway / trail / sidewalk	MnDOT 2211.3
Full Depth Reclamation	1/12,000 yd ²	DCP for FDR	See Specification	1 per 250' of roadway / trail / sidewalk	MnDOT 2215

7) CONSTRUCTION STAKES, ALIGNMENT AND GRADE

All work under this contract shall be constructed in accordance with lines and grades shown on the drawings and as established by the Engineer.

The Contractor shall give the Engineer 48 hour notice of the Contractor's need for the establishment of line, grades and builds. After lines, grades and builds for any part of the work have been given by the Engineer, the Contractor shall be held responsible for the proper execution of the work and to protect and preserve all survey stakes until the work is completed. The Contractor shall at his/her own expense correct any mistakes that may be caused by their unauthorized disturbances or removal.

Lay and maintain pipe to the required lines and grades, with manholes, catch basins and fittings at the required locations. The Owner will furnish one set of line, grade and build stakes for the work. It shall be the Contractor's responsibility to preserve all survey stakes from loss or displacement. The Engineer may replace stakes he deems necessary for the proper prosecution of the work. Replacements shall be at the Contractor's expense. Lay pipes to the grade shown on the contract drawings. Make no deviation from the required line or grade except with the written consent of the Engineer.

The Contractor shall remove all survey stakes and lath from the job site upon completion of the project.

8) UNDERGROUND, SURFACE AND OVERHEAD UTILITIES

a. EXISTING UTILITIES

Existing water and sewer mains, and other underground utilities, are shown on the plans by general location. The owner does not guarantee the locations as shown on the plans, and the Contractor shall be responsible for verifying the exact location of these utilities, without additional compensation. Prior to the start of any construction, the Contractor shall notify all utility companies having utilities in the project area.

It shall be the Contractor's responsibility to determine and verify the location of existing pipes, valves or other underground structures as necessary to progress with the work with no additional compensation allowed. The Engineer shall make known records available.

b. OVERHEAD UTILITIES AND OBSTRUCTIONS

The Contractor shall protect overhead utilities, poles, etc. against damages.

9) PRIVATE PROPERTY PROTECTION

Protect trees, fences, poles and other private property unless their removal is authorized; and satisfactorily restore property damage or provide adequate compensation.

10) EXCAVATION AND TRENCH PREPARATION

The trench and trench bottom should be constructed in accordance to OSHA 2226 and OSHA 1926. Trenching should also be done in accordance with ASTM-D2321 – Section 7.

a. CLASS OF BEDDING

Class B, C-1, or C-2 bedding as shown on the standard detail plate SS-14 & SS-15, shall be used as directed on the plans or specified in the special provisions. Bed PVC pipe in accordance with the specifications described below. Special bedding shall be in accordance with the special provisions.

i. POLYVINYL CHLORIDE PIPE (PVC) PIPE.

Install and bed PVC pipe in accordance with ASTM Specification D-2321, and as shown in standard plate SS-15.

ii. POLYETHYLENE PIPE

Backfill shall consist of native or select type A, B or C granular material as outlined in ASTM D-2321.

iii. ACHIEVE CLASS B CLASS BEDDING

Compacted backfill in the "pipe zone". Bed the pipe in compacted crushed rock or pea gravel placed on a flat trench bottom. The bedding shall have a minimum thickness of 1/4 the outside pipe diameter and extend halfway up the pipe barrel at the sides. Fill the remainder of the side fills and a minimum depth of twelve inches (12") over the top of the pipe with compacted granular selected material.

iv. ACHIEVE CLASS C BEDDING

Shall be achieved by bedding the pipe with care in an earth foundation formed in the trench bottom by a shaped excavation which will fit the pipe barrel with for a width of at least 50% of the outside pipe diameter. Fill the sides and area over the pipe to a minimum depth of six inches (6") above the top of the pipe with compacted normal fill material.

b. CORRECTING FAULTY GRADE

Correct part of the trench excavated below grade with approved material and thoroughly compact without additional compensation.

c. PIPE FOUNDATION IN POOR SOIL

If, in the opinion of the Contractor, the material below the pipe is too soft to adequately support the pipe, the Contractor shall immediately inform the Engineer. When the bottom at subgrade is soft and in the opinion of the Engineer or representative of the Owner, cannot adequately support the pipe, excavate a further depth and/or width and refill to pipe foundation grade with approved material and thoroughly compact to assure a firm

foundation for the pipe with extra compensation allowed as provided elsewhere in these specifications.

11) BACKFILLING

Backfilling and grading shall be performed in accordance with the provisions of MnDOT 2503 and as amended and modified herein.

Backfill excavation in trenches to the original ground surface or to grades as specified or shown on the plans. Begin the backfilling as soon as practicable after the pipe has been placed. Prior to backfilling, clean the excavation of trash, debris, organic material, and undesirable material. Backfilling shall be done as completely as possible so as to prevent after settlement. The materials shall be compacted to attain complete filling by using the best materials available for this purpose, free from boulders or stones. Depositing of the backfill shall be done so the shock of falling material will not damage the underlying materials. Complete cleanup shall proceed directly behind the backfilling to accommodate the return to normal conditions. The Contractor shall have sufficient equipment on the job to assure timely backfill and cleanup at all times. Backfill trenches every night prior to leaving job site. Trenches may be left open with appropriate protection with approval by the Engineer and Owner. The Contractor shall take full responsibility for any mishaps that might occur for non-compliance of this requirement.

When the trench excavation is within the right-of-ways of State or County, the backfilling of the trench, compaction of materials and subgrade preparation shall be done in strict accordance with the existing requirements and specifications of the State or County Highway Department at no additional compensation.

The lower portion of the trench around the pipe shall be backfilled in accordance with the requirements shown for the pipe material. Granular material, free from rocks and boulders, shall be carefully placed by hand simultaneously on both sides of the pipe to a height of at least one foot (1') above the top of the pipe when specified to completely fill all spaces under and adjacent to the pipe. Backfill shall be tamped thoroughly on each side and under the pipe as far as practicable in layers not exceeding six inches (6") in thickness. Shovel place and hand tamp the pipe bedding material to fill spaces under and adjacent to the pipe. A jumping jack is required to be used along the length of the pipe on both sides.

Succeeding layers of backfill may contain coarse materials, but shall be free from pieces of rock, frozen material, concrete, roots, blacktop chunks,

stumps, tin cans, rubbish and other similar articles whose presence in the backfill, in the opinion of the Engineer, would cause settlement of the trench, or damage to the pipe. No black dirt, loam or other unsuitable materials shall be used as backfill in the trenches lying in the paved portion of the street. Under no condition shall lumps of broken blacktop or other such material of a size larger than two inches (2") in diameter be placed in the upper one foot (1') of the finished grade.

Backfill the trench to obtain compaction, with the lift thickness as required with a maximum of one foot (1') lifts. Compact the backfill material to 95% of the standard moisture density relationship of soils (ASTM D698-70) except the top three feet (3') of the trench which shall be compacted to 100% density.

Backfilling of utilities installed down lot lines shall require material to be compacted to 100 percent of the standard moisture density relationship of soils regardless of depth.

Backfilling of trenches in the traveled portions of the streets and under the curbs shall be accomplished in one foot (1') lifts. Where there is granular soil, compaction shall be obtained in each lift using a vibratory compactor. Where there are cohesive soils, the compaction of each list shall be obtained using a sheep's foot roller. No peat or other organic soils shall be backfilled under the traveled portions of streets.

Rubber-tired equipment shall be used to backfill trenches where other equipment will damage existing bituminous surfaces or sod.

In the event that suitable, granular material is not encountered during the normal excavation of the trench or when the material encountered is determined unsuitable by the Engineer for backfilling around the pipe as required above, the Contractor shall provide and place such approved material (sand fill) as required with no additional payment made thereto. All services shall have six inches (6") of clean sand (under #4 sieve) under and on the sides and one foot (1') above before other backfilling can proceed.

Unless specified, dispose of excavated material not suitable or not required for fill material within the project limits at the Contractor's expense. If the Engineer deems there is no area in the project limits to dispose of excess material, he shall direct the Contractor to dispose of material off site in a manner subject to the provisions of the following paragraph and the Contractor will be compensated in accordance with the bid unit price in the contract.

Before dumping materials or debris on a private or public land, the Contractor must obtain from the owner of land written permission for dumping and a waiver of claims against the owner for damage to land which may result together with permits required by law for dumping. File a copy of permission, waiver of claims and permit with the Engineer before disposal is made.

The Contractor shall provide one motor grader which shall be available at the project at all times for surface maintenance. If in the opinion of the Engineer, the Contractor is not maintaining the street surfaces sufficiently with one motor grader, the Contractor shall provide additional blades at no additional compensation.

In all cases, the Contractor shall blade the roadway after the trench has been backfilled, so that it shall provide full and adequate drainage and shall be passable to traffic when required. Existing roadway material shall be adequately salvaged, stockpiled, placed and graded to cap off the backfilled areas for purposes of maintaining access and providing a drivable surface free of rutting and ponding of water. Segregating soils during these operations is a specific requirement to prevent contamination of the soils that are needed for these purposes. The Contractor shall maintain the roadway in a condition acceptable to the Engineer at all times until final acceptance of the entire work by the Owner. This work shall be considered incidental.

Additional import material needed for purposes of maintaining traffic shall only be authorized and used for the specific purpose of maintaining traffic when full and proper measures have been taken to salvage and use the existing roadway base materials and all on-site material has been exhausted. Payment for additional material shall only be upon specific approval by the Engineer and shall be included for payment under the bid item of similar material.

In addition to the blading and maintenance requirements specified under this article, the Contractor shall also be required to adequately control dust on the streets after compaction and grading when directed by the Engineer. When so directed by the Engineer, the Contractor shall provide one tank truck of adequate size with spray bar or other suitable equipment for sprinkling streets which shall be available at all times for street maintenance. If in the opinion of the Engineer, the Contractor is not maintaining adequate dust control with one tank truck, the Contractor shall provide additional tank trucks at no additional compensation.

Consider settlements greater than one inch (1") measured with a string line from one edge of the settlement to the other within the warranty period of this contract failure of the mechanical compaction and repair street surfaces, driveways, and boulevard and ditch areas at no cost to the City.

All deficiencies in the quantity of material for backfilling trenches or for filling depressions caused by settlement shall be supplied by the Contractor. Any excess material shall be hauled away and disposed of by the Contractor at no additional compensation.

12) PIPE FOUNDATIONS

The Contractor shall notify the Engineer if he encounters unstable soil not suitable for bedding of pipe. As directed by the Engineer, the Contractor shall remove unstable material and replace with improved pipe foundation material as ordered by the Engineer. The Contractor shall not be paid extra for such additional excavation, but shall be paid for as improved pipe foundation at the unit price bid. Material for improved pipe foundation shall be MnDOT Spec. 3149H coarse filter aggregate. Not less than 50 percent of the material by weight that is retained on the No. 4 sieve shall have one (1) or more crushed faces.

13) PUMPING, BAILING AND DEWATERING

The Contractor shall, at their own expense, pump, or otherwise remove any water which may exist in the trenches and shall form all dams or other work necessary for keeping the excavation clear of water during progress of the work. In case of running sand or other bad ground, the work shall proceed day and night if the Engineer so directs.

The de-watering item shall only be used for additional de-watering needs above and beyond normal construction practices as described herein. Normal construction practices include use of up to 2 pumps in the excavation in crushed rock sumps. The dewatering item shall only include the additional pumps, well points, manifolds, etc.

14) ROCK EXCAVATION

When the trench is carried through rock, the depth of excavation shall be six inches (6") below the outside barrel of the pipe, fittings, and other appurtenances for pipe of sixteen inch (16") diameter or less and shall be nine inches (9") below the outside barrel of the pipe, fittings and other appurtenances for pipe of eighteen inch (18") diameter or greater. Adequate clearance for properly jointing pipe laid in rock trenches shall be

provided at bell holes. Sand shall be backfilled and tamped to proper grade before the pipe is laid. Width of excavation shall be computed on a basis of a uniform width twelve inches (12") greater than the outside diameter of the hubs or bells of pipe.

Rock excavation shall be defined as removal of all boulders larger than 1/3 cubic yard in volume and of ledge rock, concrete, or masonry structures that require an air hammer or blasting to remove. Loose, soft or disintegrated shale or rock in its natural state, masonry or concrete which can be economically removed without air hammer or blasting shall be classified as "loose rock". No additional compensation shall be provided for excavation of this character.

15) UNFORESEEN UNDERGROUND OBSTRUCTIONS

The removal of old timber, artificial loose stone or concrete fill or other man made obstructions that hinders the normal progress of the excavation, other than utility lines, shall be classified as "Removing Unforeseen Obstructions". The removal shall be paid for at actual cost plus 15 percent, as provided in these specifications.

16) TEMPORARY BRIDGES AND CROSSINGS

The Contractor shall construct and maintain temporary bridges and crossings, complete with flaggers, wherever necessary to expedite the work or to maintain traffic. Temporary bridges or crossings shall be of ample size to safely carry the load which may come upon them as determined by the Engineer. The cost of all labor, material, tools and equipment for temporary bridges and crossings shall be borne by the Contractor, and no separate or additional payment shall be made therefore.

17) RAILROAD AND HIGHWAY CROSSINGS

The method and construction required for any work under or adjacent to railroad tracks and highways shall be in accordance with the respective railroad or highway department permit.

Before construction is started, the successful bidder shall meet with the Minnesota Department of Transportation, County Highway Department, Railroad Maintenance Engineer, the consulting Engineers and the City of Maple Grove to determine the construction procedure to be followed, methods of rerouting traffic, placing of barricades, flares, signs, flagmen, etc., and methods of preventing damage to the highway or railroad. If required by the railroad or highway department, deposit with them a

certified check in the amount specified by them to cover the required repair work.

18) QUALITY SERVICE LOCATES

This work shall consist of the Contractor providing survey quality XYZ locates of all sanitary manhole castings, sanitary services, storm structure castings, sanitary/storm inverts, sump drain services, clean out locations, gate valve boxes, curb stops, corporations, hydrants, lighting units and hand holes, and each end of each abandoned pipe prior to backfilling operations with the intent being that the locations can be inserted into the City of Maple Grove coordinate system for ease of relocation if so required.

Survey shots must be taken at the following locations:

- Center of all castings and inlets.
- Center of each gate valve box
- Center of curb stops
- Center of corporation
- Top nut on hydrant
- Center of isolation gate valve box at hydrant
- Center of cleanouts on sump drain and sanitary sewer
- Center of sump drain service stub
- Center of hand hole
- Adjacent to lighting unit
- Center of Lift Station

Horizontal and vertical control will be provided by the Engineer.

All X, Y, Z, coordinates must be within 0.05 foot tolerance for horizontal and vertical measurements.

The Contractor shall provide a spreadsheet with the information in the following column headings:

- ii. Address
- iii. Item Located
- iv. X Coordinate
- v. Y Coordinate
- vi. Z Elevation

The contractor will only be required to take shots of any utility they installed or altered in any way. The rest of the shots will be done by the Owner.

19) RESTORATION OF GROUND AND ROAD SURFACES

Wherever the surface of the ground is removed or disturbed by the Contractor's operation the Contractor shall restore, replace or rebuild all such surfaces to a condition at least equal to its condition at time of removal. Maintenance of streets and traffic shall comply with Article 5 "Maintenance of Traffic", Maple Grove Specifications for Plant Mixed Bituminous Construction and with Article 17 hereinbefore.

20) WORKMANSHIP AND CLEANUP

Upon completion of the contract, the Contractor shall dismantle and remove all construction plant, equipment, appliances, barricades and surplus materials; shall clean all streets or other services used by the Contractor; and shall do such incidental work as may be necessary to leave the work or any premises occupied by the Contractor in a neat workable condition. This work shall be done with a minimum of inconvenience to the public or public travel.

When defective work on utilities; water main, storm and sanitary that is a danger to the public's well-being or health has been noticed, the Contractor has 4 hours to respond to the Engineer with detailed information on how and when they are going to fix the defective work. If the contractor does not repair the defective work within 24 hours of written or verbal notice, the City has the right to repair and bill the contractor for the work. If the City deems the defective work a public hazard, the City has the right to immediately repair the defective work and bill the contractor.

21) METHODS OF MEASUREMENT AND PAYMENT

a. IMPROVED PIPE FOUNDATION MATERIAL

Material used for refilling to pipe foundation grade to assure firm foundation for pipe shall be paid for at the contract unit price per linear foot along the pipe in six (6) inch depth increments installed regardless of width. No foundation material will be paid for that is installed without the knowledge or consent of the Engineer nor will payment be made for rock installed only for dewatering purposes. Payment shall include cost of excavation and placement.

b. ROCK EXCAVATION

Rock excavation shall be measured by volume in cubic yards and shall be measured from the top of the rock to a point below and on each side of the outside barrel of the pipe as specified and shall be paid for in accordance with MnDOT Specification 2451.

c. QUALITY SERVICE LOCATES

There will be no measurement for Quality Service Locates. Payment shall be on a lump sum basis, based on a percent complete of the project and shall include all labor and equipment associated with gathering and tabulating quality service locates for water main, sanitary sewer, and storm sewer required items.

[END OF GENERAL SPECIFICATIONS]

**SPECIFICATIONS
FOR
WATER MAIN AND APPURTENANCES

CITY OF MAPLE GROVE, MINNESOTA**

**TABLE OF CONTENTS
January 2016**

<i>TABLE OF CONTENTS</i>	<i>PAGE #</i>
SECTION 1 - GENERAL.....	1
SECTION 2 - LOCATION	1
SECTION 3 - SCOPE OF WORK.....	1
SECTION 4 - METHOD OF PROCEDURE	1
SECTION 5 - MATERIALS	2
SECTION 6 - HANDLING OF WATER MAIN AND APPARATUS	11
SECTION 7 - LAYING OF PIPE AND FITTINGS.....	12
SECTION 8 - JOINTING OF PIPE AND FITTINGS	13
SECTION 9 - SETTING HYDRANTS.....	14
SECTION 10 - SETTING VALVES.....	15
SECTION 11 - REACTION BLOCKS.....	15
SECTION 12 - POLYSTYRENE INSULATION	16
SECTION 13 - HOUSE SERVICES.....	16
SECTION 14 - HORIZONTAL DIRECTIONAL DRILL (HDD)	17
SECTION 15 - WATER SERVICE DISTRUPTION	18
SECTION 16 - ADJUST CURB STOP STAND PIPE AND WATER VALVE BOXES	18
SECTION 17 - TESTING AND DISINFECTING MAIN.....	18
SECTION 18 - OPERATIONAL INSPECTION	21
SECTION 19 - METHODS OF MEASUREMENT AND PAYMENT	21

- This page left intentionally blank -

**SPECIFICATIONS
FOR
WATER MAIN AND APPURTENANCES
CITY OF MAPLE GROVE, MINNESOTA**

1) GENERAL

The General Specifications and the Special Provisions and Conditions as embodied in these Contract Documents shall be applied to all work and materials to be furnished and installed under these specifications.

2) LOCATION

The Water Main and appurtenances to be constructed and installed under this contract are located in the City of Maple Grove, Hennepin County, Minnesota, as shown on the drawings.

3) SCOPE OF WORK

The work to be done under this contract shall include the furnishing of all material, labor, tools, and equipment to construct, complete in place, the water main and all appurtenances as shown on the drawings and as specified herein and in accordance with all pertinent requirements of the Minnesota Pollution Control Agency and Minnesota Department of Health for the conveyance of potable water and the latest requirements of the Federal Safe Drinking Water Act.

4) METHOD OF PROCEDURE

The Contractor shall perform work in such a manner as to cause the least interference and delay to such other work as may be in progress at the time by other Contractors. The Contractor shall notify the Engineer in writing of his/her intentions to commence work at least five (5) days prior to moving onto the site.

Prior to the start of any work, the Contractor shall submit in writing to the Engineer a schedule of procedure and shop drawing submittals.

The Contractor shall notify the Owner and the affected property owners before shutting off water mains. The Contractor must plan his/her operation to cause the least amount of disruption of water service in the affected area.

The Contractor shall be responsible for the operation of all existing and new gate valves required for the installation of water main and other appurtenances. The Owner and or on-site inspection staff must be present during the operation of all valves. If Contractor fails to have appropriate staff present or by negligent acts a gate valve mal-functions, it is the Contractor's responsibility to remedy the situation to the satisfaction of the Owner. If the Contractor fails to take appropriate action, the Owner shall have the corrections made and assess \$500.00 for damages plus costs incurred.

5) MATERIALS

All materials required for this work shall be new material conforming to requirements of the reference specifications for the class, kind, type, size, grade, and other details indicated in the Contract. The Contractor shall submit in writing a list of materials to be furnished showing the manufacturer and designation of all items, said list to be approved by the Engineer prior to installation.

a. POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

i. PVC Pipe

Polyvinyl chloride pressure pipe (PVC) for water main shall conform to AWWA C 900 for pipe sizes 4" to 12". All pipes shall have a minimum dimension ratio (DR) of 18 corresponding to a maximum working pressure of 235 PSI for PVC. Polyvinyl chloride pressure pipe (PVC) for water main shall conform to AWWA C 905 for pipe sizes 14" to 48". All pipe shall have a minimum dimension ratio (DR) of 25 corresponding to a pressure class of 165 PSI for PVC. The PVC compound shall be D1784. Laying length shall be 20 feet (+/- 1") for all sizes.

ii. JOINTS

The bell shall consist of an integral wall section with a factory-installed, solid cross section elastomeric ring which meets the requirements of ASTM F-477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of AWWA C 900 for sizes 4" to 12" and AWWA C 905 for sizes 14" to 24".

b. DUCTILE IRON WATER PIPE AND FITTINGS

i. DUCTILE IRON PIPE

Ductile iron pipe shall be made in accordance with ANSI Specification A21.51 (AWWA C151).

All pipe joints shall be an approved slip type joint with rubber gasket, or mechanical joint. Mechanical joint pipe shall comply with ANSI Specification A21.11. Slip joint gaskets shall be molded rubber rings made expressly for the joint used. Mechanical joint gaskets shall be made from vulcanized crude rubber compound. All surfaces shall be smooth, free from imperfections and free from porosity. Electrical conductivity for slip joint pipe must be provided by a metal cable or strap, capable of withstanding 600 amperes of current, fastened across the pipe joint.

Every pipe and fitting shall be cement lined on the inside. Cement mortar lining for ductile iron pipe and fittings shall be in conformance with ANSI Specification A21.4, except that the lining shall be half thickness (Standard Enameling). The pipes exterior shall have a bituminous seal coating at least one mil thick. It shall adhere tenaciously to the cement mortar and pipe. Spotty or thin coating, or poor adhesion, shall be cause for rejection of the pipe.

ii. DUCTILE IRON FITTINGS

Ductile iron fittings shall be Tyler, Mueller or approved equal by the engineer. Class 350 for sizes up to and including twelve inches (12") diameter and shall conform to ANSI Specification A21.53 (AWWA C153) covering short body fittings and shall be mechanical joint. Ductile iron fittings over twelve inches (12") in diameter shall comply with the above specifications and shall be Class 150.

Stainless Steel 316 grade or Cor-Blue T-bolts with Protecto Caps shall be used on all mechanical joints. No other type of bolts shall be allowed unless approved by the Engineer. Restraints fittings shall be coated with fusion bonded epoxy coating to the required requirements of ANSI/AWWA C116/A21.16.

C. RESILIENT WEDGE GATE VALVE

Valves 2"-10" shall be resilient wedge type rated for 250 p.s.i.g. cold water working pressure. All ferrous components shall be ductile iron, ASTM A536.

The wedge shall be ductile iron or bronze encapsulated with EPDM rubber and provided with male type guides and polymer guide covers.

Bolting shall be Type 316 stainless steel and shall be provided with hexagonal heads with dimensions conforming to ANSI B18.2.1. Metric size, socket head cap screws therefore are not allowed.

Operating nut shall be constructed of ductile iron and shall have four flats at stem connection to assure even input torque to the stem.

All gaskets shall be pressure energized O-rings.

Stem shall be sealed by three O-rings. The top two O-rings shall be replaceable with valve fully open and while subject to full rated working pressure. O-rings set in a cartridge shall not be allowed.

Valve shall have thrust washers located with one (1) above and one (1) below the thrust collar to assure trouble-free operation of the valve.

All internal and external surfaces of the valve body and bonnet shall have a fusion-bonded epoxy coating, complying with ANSI/AWWA C550, applied electrostatically prior to assembly.

Valves shall be certified to ANSI/NSF Standard 61-G or Standard 372.

d. BUTTERFLY VALVE

Butterfly valves and boxes shall conform and be in accordance with AWWA C504. Butterfly valves shall be American Flow Control, Kennedy, Mueller, Pratt "Ground Hog", DeZurik ACCWRT or Owner approved alternative and shall be suitable for a working pressure of 1030 Kpa (150 psi).

All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached.

Valves shall be provided with a two inch (2") square operating nut and shall open in a counter-clockwise direction.

e. VALVE BOXES

Valve boxes shall be cast or ductile iron of the three piece type suitable for a depth of 7-1/2 feet of cover over the top of the pipe or to a depth as shown on the plans. Shafts shall be 5-1/4 " diameter, bases may be round or oval and length adjustment shall be screw type. Valve boxes shall be Tyler 6860 G, Sigma VB 261-268, or Star Pipe Products, or owner approved alternate with base and size shown below:

Pipe Size	Depth to Top of Pipe	Box	Base
6 inches	7.5 feet	"G"	No. 6
8 inches	7.5 feet	"G"	No. 6

Drop covers on valve boxes shall bear the word "water" on the top and be Tyler 6860 G, Sigma VB 2600 "Stayput" covers with extended skirt or Star VB-5014, or Owner approved alternate. Use valve box extensions that screw on the outside of valve box if valve box needs an extension. No inside extensions will be allowed.

f. HYDRANTS

Hydrants shall be Waterous Pacer, or Clow Medallion and be in accordance with the standard AWWA Specification C502, latest revision, for hydrants Supply the hydrants with a 16" upper stand pipe length.

Hydrants are to have a five inch (5") minimum valve opening. Equip with two 4-1/2" pumper connections. The 4-1/2" pumper connections shall have 4 threads per inch. (Minneapolis Thread)

Hydrants shall open to the left (counterclockwise) and be marked with an arrow to show the direction of opening. Mark the hydrant with the name of the manufacturer and the year installed on the project.

g. WATER SERVICE

Water services shall be 1" SDR 11 IPS PE pipe. All services shall terminate 9' into the property unless otherwise noted.

h. FITTING RESTRAINTS & PIPE JOINT RESTRAINTS

Fittings restraints shall be designed for use on PVC pipe conforming to AWWA C 900 & C 905. Incorporate joint restraint in the design of the follower gland and include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Maintain flexibility of the joint after burial. Manufacture glands of ductile iron conforming to ASTM A536-65.

Use twist-off nuts, sized same as tee-head bolts, to ensure proper actuating of restraining devices. The mechanical joint restraint device shall have a working pressure of at least 250 psi with a minimum safety factor of 2:1 and be EBAA Iron, Inc. Restraints fittings shall be coated with fusion bonded epoxy coating to the required requirements of ANSI/AWWA C116/A21.16.

i. ELECTROFUSION FITTINGS

Electrofusion fittings manufactured in compliance with ASTM F-1055 and tested in compliance with ASTM-D2513 and AWWA C906. Resin is PE 3408 virgin material that complies with ASTM D1248: ASTM D3350. The resins have a NSF Standard 14 listing and a PPI rating. Electrofusion fitting shall be pressure rated for maximum operating pressure of 165 PSI. The fitting shall be manufactured with an integral identification resistor, which automatically sets the fusion time on the Electrofusion Processor.

Electrofusion fittings shall be used to connect PE water service lines to all Polycam flare nut fittings. Electrofusion fittings shall conform to PE3408 Electrofusion Couplings Standard Specifications as produced by Central Plastics Electrofusion Fittings, or owner approved alternative. Installation of the fittings shall conform to ASTM F1290.

j. SERVICE SADDLES

- i. Service Saddles are required for taps made on PVC Water main. The saddles shall be Smith-Blair 372. Service taps shall be made a minimum of 3 feet apart as measured from the tap location. Saddles shall be a full faced gasket.

k. CORPORATION STOPS

Corporation stops shall be;

- i. FORD
 - ii. 1" = FB 600-4-NL, 1 ½" = FB 600-6-NL, 2" = FB 600-7-NL
- ii. McDONALD
 - ii. McDonald 74701-B
- iii. MUELLER
 - ii. Mueller B-25000-N

Polycam flared nut series 914 are required to connect the SDR 11 IPS PE service pipe to the corporation.

l. TAPPING SLEEVES (WET TAPS)

All tapping Sleeves shall be Smith-Blair Model No. 662. The tapping sleeve body shall be a full circumference band, 18-8 type 316 stainless steel. The flange shall be in accordance with specifications of AWWA C207 Class D, and shall conform and meet ANSI 1030 Kpa (150 psi) drilling with an epoxy coated finish. The Gasket shall be Grade 60 concave wedge steel. The bolts, nuts, and washers shall be 18-8 type 316 stainless steel. Nuts and studs shall be coated to prevent galling.

m. CURB STOPS

Curb stop shall be;

- i. FORD
 - ii. 1" X 1" = B 22-444-M-NL

- iii. 1 ½" X 1 ½" = B 22-666-M-NL,
 - iv. 2" X 2" = B 22-777-M-NL
- ii. McDONALD
 - ii. 76104
- iii. MUELLER
 - ii. B-25154-N

Polycam flared nut series 914 are required to connect the SDR 11 IPS PE Service Pipe to the curb stop.

n. STOP BOXES

The stop box shall be an extension type with stationary rod – Minneapolis pattern base and a 1" upper section, 12" adjustment with an 8-foot length when fully extended.

Stop Boxes shall be:

- i. 1" SERVICES
 - ii. FORD - EM2-8046-78-R WITH PS LID
 - iii. MUELLER – H-10332 SERIES WITH 89376 LID
 - iv. McDONALD – 5610 WITH 5604L LID
- ii. 1-1/2" AND 2" SERVICES
 - ii. FORD – EM2-80-47-78-R WITH PS LID
 - iii. MUELLER – H-10332 SERIES WITH 89376 LID
 - iv. McDONALD – 5611 WITH 5607L LID

o. TRACER WIRE

A tracer wire shall be laid with all pipes.

For pipe bursting or horizontal directional drill operations, it shall be water blocking #19 AWG solid copper conductor and tin plated with Kevlar strength water blocking yarns with minimum breaking strength of 1,800 pounds, Kevlar braid, polyethylene jacket and inner and

outer HDPE jacket. Product shall be Trace Safe® or Owner approved alternative.

For all installations tracer wire shall be direct burial #12 AWG Solid (0.0808" diameter), 21% conductivity copper-clad hard drawn high carbon steel extra high strength horizontal directional drill tracer wire, 1150 pound average tensile break load, 45mil. The conductor insulator shall consist of a high molecular weight-high density yellow polyethylene jacket complying with ASTM-D-1248, 30 volt rating.

Termination of the tracer wire shall be connected to all metal fittings including but not limited to; gate valves, curb stops and fire hydrants. The tracer wire shall be incidental to pipe installation. The terminations shall be a 1" cast brass ground clamp to be on curb stops just below the cap on the standpipe and shall be installed 4" – 6" below finish grade elevation. This work shall be considered incidental.

Tracer wire shall be securely affixed to the top exterior surface of the pipe using PVC pipe tape at 5-foot intervals. Tracer wire shall be looped around valves, saddles, curb stops, and other appurtenances in such a manner that there is no interference with the operation of the appurtenances. Tracer wire shall be continuous and without splices, breaks, or cuts except for spliced-in connections as approved by the Engineer. Where approved spliced-in connections occur, 3M DBR watertight connectors, or owner approved alternative, shall be used to provide electrical continuity.

DryConn Waterproof Direct Bury Lugs as manufactured by King Innovation, or owner approved alternative, shall be used to splice into the main line tracer wire. The main line tracer wire shall not be broken or cut. High Density Extra-High Molecular Weight Polyethylene (HDPE) Pipe

p. HIGH DENSITY EXTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE (HDPE) PIPE

i. MANUFACTURER

All HDPE pipe and fittings shall conform to ASTM D3350, D3035, ASTM F714 and AWWA C906

Both pipe and fittings shall carry the same pressure rating. All fittings shall be pressure rated to match or exceed the system piping to which they are joined.

ii. FITTINGS

The standard HDPE fittings shall be standard commercial products manufactured by injection molding or by extrusion and machining, or, shall be fabricated from PE pipe conforming to this specification. The fittings shall be fully pressure rated by the manufacturer to provide a working pressure equal to the pipe for 50 years' service at 73.4°F with an included 2:1 safety factor. The fittings shall be manufactured from the same resin type, grade, and cell classification as the pipe itself. The manufacture of the fittings shall be in accordance with good commercial practice to provide fittings homogeneous throughout and free from crack, holes, foreign inclusions, voids, or other injurious defects. The minimum "quick-burst" strength of the fittings shall not be less than that of the pipe with which the fitting is to be used. Fittings will be listed for each size and type of fitting on proposal.

iii. JOINING

The fusion equipment and operator shall be certified by the pipe manufacturer. Sections of polyethylene pipe should be joined by butt fusion or Electrofusion fittings and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400°F, alignment, and 75 psi interfacial fusion pressure.

iv. MECHANICAL JOINT CONNECTION WITH HDPE PIPE

Connection to valves, hydrants, etc. will require mechanical joint transition fittings from HDPE to DIP.

Mechanical joint transition fittings shall be considered incidental to the pipe.

V. HDPE PIPE MARKING

During extrusion production, the HDPE pipe shall be continuously marked with durable printing following this format:

- ii. Nominal Size
- iii. Dimension Ratio
- iv. Pressure Rating
- v. Type
- vi. Material Classification
- vii. Certification Bases
- viii. Blank Position for NSF/FM Use
- ix. Pipe Test Category
- x. Plant
- xi. Extruder Number
- xii. Date
- xiii. Operator Number
- xiv. Shift Letter
- xv. Resin Supplier Code

q. AIR RELIEF MANHOLE CASTING

The standard manhole casting shall be Neenah Foundry No. R-1723.
The minimum allowable weight shall be 350 pounds.

6) HANDLING OF WATER MAIN AND APPARATUS

The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact, and without physical damage. The transportation carrier shall use appropriate method and intermittent checks to insure the pipe is properly supported, stacked, and restrained during transport such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging of the pipe. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The handling of the pipe shall be done in such a manner that it is not damaged by dragging over sharp objects or cut by chokers or lifting equipment.

Sections of pipe having been discovered with cuts or gouges in excess of 10% of the wall thickness of the pipe shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the butt fusion joining method.

Fused segments of pipe shall be handled so as to avoid damage to the pipe. When lifting fused sections of pipe, chains or cable type chokers must be avoided. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections. Care must be exercised to avoid cutting or gouging the pipe.

The Contractor shall be responsible for material furnished. Any materials that are found defective in manufacture or that have become damaged in handling after delivery by the manufacturer shall be replaced at Contractor's expense. This shall include the furnishing of material and labor required for the replacement of installed material discovered defective prior to the final acceptance of the work, or during the warranty period of the work.

The Contractor shall be responsible for the safe storage of material furnished and accepted by him, and intended for the work, until it has been incorporated in the completed project. The interior of pipe, fittings, and other accessories shall be free from dirt and foreign matter at all times. Drain and store valves and hydrants in a manner that will protect them from damage and freezing.

7) LAYING OF PIPE AND FITTINGS

Water main materials shall be carefully lowered into the trench by suitable tools or equipment in such a manner as to prevent damage to materials and protective coatings and lining. Under no circumstances shall water main materials be dumped into the trench.

All foreign matter or dirt shall be removed from the inside of the pipe and fittings before it is lowered into its position in the trench, and shall be kept clean by approved means during and after laying. In the suspension of work at any time, suitable stoppers shall be placed to prevent earth or other substances from entering the main.

Water mains shall be laid at least ten feet (10') horizontally from any sanitary sewer, storm sewer, or sewer manhole, whenever possible. When local conditions prevent a horizontal separation of ten feet (10'), a water main

may be laid closer to a storm or sanitary sewer provided that the bottom of the water main is at least eighteen (18) inches above the top of the sewer.

Water mains crossing house sewers, storm sewers, or sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer. When local conditions prevent a vertical separation as described, the following construction shall be used:

- i. Sewers passing over water mains or less than 18 inches below water mains shall be constructed of materials equal to water main standards of construction.

In addition, sewers passing over water mains shall be protected by providing:

- i. A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main.
- ii. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking the water mains.
- iii. That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

Every pipe shall be bedded uniformly throughout its entire length.

No pipe shall be laid in water or when the trench conditions are unsuitable for such work.

Concrete blocking is required behind all bends over 12 degrees. Manhole blocks may be used for blocking on bends that are under 12" diameter. Sizes 12" and above would require poured-in-place concrete. For dead-end stubs or service stubs, the slip joints must be rodded at the joint using retainer glands and rods. These requirements are in addition to the EBAA Iron, Inc. See Maple Grove Standard Plate WM-10 for more details.

8) JOINTING OF PIPE AND FITTINGS

Complete jointing of mechanical joint pipe, push-on joint pipe, and fittings in accordance with AWWA Section 9b and 9c of AWWA Specification C600 latest revision.

When pipes are cut in the field, the cut or straight end shall have sharp or rough edges removed before assembly.

For approved slip-on joints, the jointing shall be done strictly in accordance with approved methods. Proper assembly tools shall be used.

Both the spigot and socket must be thoroughly clean, free from tar or other coatings and rust.

For mechanical joint pipe, the last eight inches (8") outside the spigot end of the pipe and the inside of the bell, fittings, and gate valves shall be thoroughly cleaned to remove oil, grit, tar (other than standard coating) and other foreign matter from the joint and then painted with a standard solution furnished by pipe manufacturer.

After the spigot end of a pipe is placed into the bell and pulled home, the gasket shall be pressed into place within the bell evenly around the entire joint. After the gland is positioned behind the gasket, the Contractor shall install all bolts and nuts and tighten them with a torque wrench. Nuts spaced 180 degrees apart shall be tightened alternately to produce equal pressure on all parts of glands.

Jointing shall be done, unless specifically excepted above, in accordance with "Notes on Method of Installation" included in ANSI Specification A.21.11 for a mechanical joint for pressure pipe and fittings.

When pipes are cut in the field, or when slip-on joints are joined to mechanical joint spigots, or spigots with straight ends, the cut or straight end shall be beveled and all sharp or rough edges shall be removed. Only EBAA Iron, Inc. Megalugs are approved for jointing pipes and fittings.

Butt fusion joining shall be 100% efficient offering a joint weld strength equal to or greater than the tensile strength of the pipe. Socket fusion shall not be used, except for services. Extrusion welding or hot gas welding of HDPE shall not be used for pressure pipe applications nor in fabrications where shear or structural strength is important. Flanges, unions, grooved-couplers, transition fittings and some mechanical couplers may be used to mechanically connect HDPE pipe without butt fusion. Refer to the manufacturer's recommendations.

9) SETTING HYDRANTS

Hydrants shall be placed where shown on the plans or where directed by the Engineer.

Hydrants shall be supported upon a concrete base minimum of eight inches (8") thick. Each hydrant shall be braced against undisturbed ground by an eight inch (8") thrust block. Hydrants shall be rod tied back to the main line using 5/8" minimum sized tie rods with a non-corrosive coating. Only EBAA Iron, Inc. Megalugs are allowed in lieu of tie rods for joint restraint.

Hydrants of sufficient length shall be installed as to provide a minimum of seven and one half feet (7 ½') of ground cover over the top of the lead pipe and the lowest outlet nozzle on the hydrant shall be not less than twenty-one inches (21") nor more than twenty four inches (24") above the ground line.

The Contractor shall obtain proper adjustments using ductile iron pipes, water main fittings, short vertical depth type hydrants, or other methods as pre-approved by the Engineer. All material and fittings used to attain proper elevation will be considered incidental.

A drainage pit two feet (2') in diameter and three feet (3') deep shall be excavated below each hydrant base and filled compactly with coarse gravel or crushed stone and coarse sand, under and around the elbow and concrete base to a level of six inches (6") above the waste opening.

Cover all material placed for drainage with a minimum of two layers of four (4) mil polyethylene.

Hydrants must maintain their position and must not be displaced out of plumb during backfilling. Any hydrant out of plumb shall be excavated, reset, (including blocking) and re-backfilled. This work shall be incidental to the hydrant.

10) SETTING VALVES

Valve boxes shall be firmly supported to maintain a centered and plumb alignment over the wrench nut of the gate valve, with box cover flush with the surface of the finished pavement or at such other level as may be directed by the Engineer.

11) REACTION BLOCKS

All plugs, caps, tees and bends deflecting more than 12 degrees shall be provided with reaction blocks. Concrete, suitable metal rods or harness, which are rust-proofed and/or retainer glands may be used subject to the Engineer's approval. Reaction blocking shall be so placed that all pipe and fitting joints are accessible for repair, and in such a manner as to provide bearing against undisturbed ground.

Testing of lines shall not proceed until concrete thrust blocks have attained their design strength. See Maple Grove Standard Plate WM-11 for more details.

12) POLYSTYRENE INSULATION

This work shall consist of furnishing and installing insulation board above the water main and sewer pipe at the locations designated in the Drawings. This work shall be performed in accordance with the details, the applicable MnDOT Standard Specifications, and the following:

The insulation board shall be rigid expanded polystyrene conforming to the material requirements of MnDOT 3760. Styrofoam S.M. and Styrofoam TG brand insulation is an approved insulation material.

The insulation material shall be furnished in panels 2 inches thick and shall be placed on a smooth level foundation in a staggered manner that will provide joint overlaps a minimum of 6 inches on the underlying sheets and the edges shall be trim and square.

The placement of the backfill material over the insulation board and compaction thereof shall be accomplished in a manner that will preclude damage to the insulation material. Construction equipment of any kind shall not operate directly on the insulation board. Sections of insulation board damaged by the Contractor's construction operations shall be replaced at the Contractor's expense. See Maple Grove Standard Plate wm-12 for required size and thickness of Polystyrene Insulation.

13) HOUSE SERVICES

It shall be the duty of the Contractor to cooperate with the Owner to keep accurate records of service connections as to location, depth to top of connection, size of connection provided and other pertinent data. Tap location shall be made in respect to the nearest manhole or hydrant from the service. Curb stops shall be located as shown on the drawings and the position located with ties to houses or other existing structures. All service

fitting shall have a GPS shot of their location done by the Contractor within the tolerance of 4" (inches). Water services shall be located at least three feet (3'), measured horizontally, away from sanitary sewer services on the upstream side and for the most convenience to the benefited property.

The Contractor shall make all taps into the water main at an angle of 45 degrees from horizontal and install corporation stops.

The SDR 11 IPS PE service lines between the water main and the curb boxes shall have a minimum of 7.5 feet of cover except at the goose neck which shall have 6-1/2 feet minimum cover and place as a continuous line. Service lines must be placed beneath obstructions which would prohibit the required cover if the service line was placed on top of obstruction. The method of tunneling under an obstruction shall be approved by the Engineer and incidental to the project.

Mark each curb box with a 4' long, 2" x 2" wooden post, extending to a point two feet (2') above the ground.

When using 4" or larger pipe for a service line, retain the last two (2) uncut lengths of pipe and the plug by use of a bell clamp and use only EBAA Iron, Inc. Megalugs or other method approved by the Engineer. A 10-foot horizontal separation is needed between 4" or larger water service and the sanitary sewer service.

No water service shall be installed within ten feet (10') horizontally from a manhole. Water service piping, no matter the size, shall be installed in one continuous piece without intermediate joint couplings between the corporation and the curb stop box.

14) HORIZONTAL DIRECTIONAL DRILL (HDD)

Fusible PVC, Cert-Lok, or High-density, extra-high molecular weight polyethylene (HDPE EHMW) pipe shall be used for the HDD installations as specified on the Drawings or as approved by the Engineer.

All piping system components shall be the products of one manufacturer.

The pipe shall have a minimum SDR (Standard Dimension Ratio) wall thickness, nominal size and pressure rating as specified on the Drawings.

A minimum of two (2) tracer wire lines shall be drilled with the pipe.

Pipe and fittings may be rejected for failure to meet any of the requirements of these specifications. No compensation will be given the Contractor for rejected materials.

The Contractor shall be responsible for pipe refusal, lost heads, mud loss, heaving of surface features, etc. that may result from the operation of directional drilling. The means and methods for rectifying the drilling concerns shall be incidental and approved by the Engineer.

15) WATER SERVICE DISRUPTION

a. GENERAL

The Contractor must plan their operation to cause the least amount of disruption of water service in the affected area. The Contractor shall notify the Engineer and Owner a minimum of two (2) working days prior to shutting off the water main. The Owner will supply a letter for the Contractor to distribute to all affected properties. Property owners must be given a minimum of 24 hours' notice prior to shutting off the water main. All hydrants shall be plumb and all curb stop boxes shall be to grade, plumb and concentric about the operating nut after relocation.

16) ADJUST CURB STOP STAND PIPE AND WATER VALVE BOXES

a. GENERAL

The Contractor is responsible for the protection of all underground utilities which are located in the field or are shown on the plans, and shall adjust all water valve boxes and curb stop boxes which require such adjustment. After adjustment, all valve boxes shall be $\frac{1}{4}$ " to $\frac{1}{2}$ " below finished grade and shall be in proper working order. Asphalt used to adjust manholes is incidental to the adjustment. All curb stop boxes and valve boxes shall be plumb and concentric about the operating nut after adjustment.

b. ADJUST CURB STOP STAND PIPE

This work shall consist of adjusting the standpipe to 1" below finished sod line. If the existing standpipe cannot be adjusted to the proper elevation, then the top of the pipe shall be cut and re-threaded or the setscrew type of top may be used. All interim adjustments are considered incidental.

17) TESTING AND DISINFECTING MAIN

The Contractor shall notify the Engineer and the City Utility Department 24 hours prior to testing of utilities. The Engineer or a representative from the City Utility Department must witness all utility testing.

a. HYDROSTATIC TESTING OF WATER MAINS

After the pipe has been installed and backfilled it shall be subjected to hydrostatic pressure of 150 pounds per square inch. The duration of each such test shall be at least two (2) hours. No water will be allowed to be added to the water main during water main pressure testing. Any pipe greater than 16" the pressure test needs to be approved by the Owner prior to hydrostatic test. The allowable pressure drop shall not exceed two (2) PSI in either hour or three (3) PSI in the two (2) hour period.

Each section of pipe shall be slowly filled with water and the specified test pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner. The pump, pipe connection, gauges and all necessary apparatuses shall be furnished by the Contractor. Gauges and measuring devices must meet with the approval of the Engineer and the necessary pipe taps made as directed. Before applying the specified test pressure, all air shall be expelled from the pipe. To accomplish this, taps shall be made, if necessary, at points at highest elevations, and afterward tightly plugged. All taps made for testing shall be at the Contractor's expense.

The test gauge shall be certified accurate by accredited testing agency within one year from date of test to be performed. The dial shall register from 0 to 200 PSI and shall be minimum four and one half inch (4-1/2") diameter; readings marked in minimum one pound increments and have a mirrored band on the dial face using a knife-edge pointer accurate to $\pm 0.25\%$ over full scale.

The contractor shall insure that the water main installed meets the pressure test. The contractor may test against an existing valve. However if an existing gate valve does not hold pressure the Contractor shall install either a temporary gate valve or a plug to test against.

The installation of such temporary fittings and sleeves on the main after the test will be at the Contractor's expense.

b. DISINFECTING WATER MAIN

Disinfect the new pipe, valves and fittings as described in AWWA Specification No. C651, by use of the tablet or granule method which is described as follows:

Place hypochlorite tablets in each section of pipe and also in hydrants, hydrant branches and other appurtenances during construction.

Placing of calcium hypochlorite granules. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft intervals. The quantity of granules shall be as shown in Table 1.

WARNING: This procedure must not be used on solvent-welded plastic or on screwed-joint steel pipe because of the danger of fire or explosion from the reaction of the joint compounds with the calcium hypochlorite.

Table 1 Ounces of calcium hypochlorite granules to be placed at beginning of main and at each 500-ft interval

Pipe Diameter (d)		Calcium Hypochlorite Granules	
Inch	Millimeter	Ounces	Grams
4	100	1.7	57
6	150	3.8	113
8	200	6.7	200
10	250	10.5	300
12	300	15.1	430
14 and larger	350 and larger	$D^2 \times 15.1$	$D^2 \times 427.9$

Where D is the inside pipe diameter in feet $D = d/12$

The number of tablets required per 20 foot length of pipe based on 3-3/4 grain available chlorine per tablet is as follows:

Diameter	No. of tablets
4"	1
6"	2
8"	3
10"	4
12"	5
16"	9
18"	12
20"	14
24"	20

Tests are required to determine chlorine residual at the end of the 24 hour retention period and after flushing to ascertain that heavily chlorinated water has been removed from the pipeline. At the end of the 24 hour retention period, the main shall contain not less than 0.5 ppm or not more than 1.0 ppm of free chlorine.

The City of Maple Grove shall test for bacteria and it shall meet Minnesota Health Department requirements. If the test fails to meet requirements, the Contractor shall re-chlorinate until requirements are met. Passing bacteria tests will be paid for by the Owner. Costs associated with failing bacterial tests will be charged to the Contractor.

C. ELECTRIC CONTINUITY TEST

A continuity test shall be performed by the Contractor on all tracer wire with the Engineer present to verify that the trace wire is continuous and allows for the proper tracing of the piping. If the trace wire is not continuous, to include all connection points between new and existing water mains, the Contractor, shall make necessary repairs/corrections. Continuity testing shall be conducted prior to paving roadways.

18) OPERATIONAL INSPECTION

At the completion of the project, and in the presence of the Engineer, the Contractor shall operate all valves, hydrants and water services to ascertain that the entire facility is in good working order. This includes

verification that all valve boxes are centered and valves are opened. All hydrants operate and drain properly.

19) METHODS OF MEASUREMENT AND PAYMENT

a. WATER MAIN

Water main pipe will be paid for at the contract price per lineal foot for diameter of pipe furnished, including the cost of furnishing the pipe, rubber gasket, tracer wire, other material, delivering, handling, laying, trenching, granular bedding, backfilling, testing, disinfecting, and all other material or work necessary to install the pipe complete in place at the depth specified.

b. WATER MAIN FITTINGS

Ductile iron and HDPE fittings and specials will be paid for at the contract unit price per each fitting including fitting restraints.

c. HYDRANTS

Hydrants will be paid for at the contract unit price per hydrant installed complete with drainage pit, gravel, concrete base, and bracing. The unit price for the hydrant does not include the auxiliary hydrant valve which shall be paid for under another item of these specifications, unless they are combined in bid proposal.

d. GATE VALVES AND BOXES

Gate valves and boxes (including covers and extensions) shall be paid for at the unit price bid for each size valve and box furnished and installed complete.

Valve boxes located within the street will need to be adjusted twice. Once after the base lift of bituminous and again prior to the bituminous wear course. The initial adjustment will be incidental. The final adjustment will be paid for at the bid unit price for adjust valve box. The initial adjustment must be completed within 10 days after the bituminous base course has been placed. If the Contractor does not complete the raising, adjusting, cleaning and patching of the gate valves, a \$500.00 per day penalty will be imposed on the Contractor until such work is done.

e. SDR 11 IPS PE WATER SERVICE PIPE

SDR 11 IPS PE water service pipe will be paid for at the contract unit price per lineal foot, for diameter of pipe furnished, measured from the corporation stop to the centerline of curb box. The unit price shall include pipe, miscellaneous items associated with the work including but not limited to the polycam series 914 transition fittings, electrofusion fittings, tracer wire and pipe bedding.

f. SERVICE TAP

Service taps will be paid for at the contract unit price for size furnished and installed and shall include corporation stop, stainless steel saddle, and tap for PVC water main installations.

Service taps on HDPE water main will be paid for at the contract unit price for size furnished and installed and shall include the tap, saddle socket, weld, corporation stop and other miscellaneous work for HDPE water main installations.

g. CURB STOPS AND BOXES

Curb stops and boxes will be paid for at the contract unit price for size furnished and installed and shall include curb stop, box, extension, and lid.

h. POLYSTYRENE INSULATION

Measurement will be made by the area insulated as specified. Payment will be made under Item Polystyrene Insulation at the Contract bid price per square foot, which shall be compensation in full for all costs incidental thereto.

i. IMPROVED PIPE FOUNDATION MATERIAL

Material used for refilling to pipe foundation grade to assure firm foundation for pipe shall be paid for at the contract unit price per linear foot along the pipe in six (6) inch depth increments installed regardless of width. No foundation material will be paid for that is installed without the knowledge or consent of the Engineer nor will payment be made for rock installed only for dewatering purposes. Payment shall include cost of excavation and placement.

j. SPECIAL REQUIREMENTS OF MINNESOTA DEPARTMENT OF HEALTH DIVISION OF ENVIRONMENTAL HEALTH

Water mains crossing house sewers, storm sewers, or sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the sewer. When local conditions prevent a vertical separation as described, the following construction shall be used:

- i. Sewers passing over or less than 18 inches below water mains shall be constructed of materials equal to water main standards of construction.
- ii. In addition, sewers passing over water mains shall be protected by providing:
 - A vertical separation of at least 18 inches between the bottom of the sewer and the top of the water main.
 - Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking the water mains.
 - That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.
- iii. Water mains shall be laid at least ten feet (10') horizontally from any sanitary sewer, storm sewer, or sewer manhole, whenever possible. When local conditions prevent a horizontal separation of ten feet (10'), a water main may be laid closer to a storm or sanitary sewer provided that:
 - The bottom of the water main is at least eighteen inches (18") above the top of the sewer.
 - Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling.

[END OF WATER MAIN & APPURTENANCES]

**SPECIFICATIONS
FOR
SANITARY SEWER, STORM SEWER
AND APPURTENANCES**

CITY OF MAPLE GROVE, MINNESOTA

JANUARY 2016

TABLE OF CONTENTS

PAGE #

SECTION 1 - GENERAL.....	1
SECTION 2 - LOCATION	1
SECTION 3 - SCOPE OF WORK.....	1
SECTION 4 - MATERIALS	1
SECTION 5 - JOINTING MATERIAL	5
SECTION 6 - MANHOLES AND CATCH BASINS	5
SECTION 7 - EXCAVATION AND TRENCH PREPARATION	7
SECTION 8 - LAYING OF PIPE	8
SECTION 9 - HOUSE CONNECTIONS, WYES.....	10
SECTION 10 - SUMP DRAIN CLEANOUT, AND SUMP DRAIN INLET.....	10
SECTION 11 - SETTING MANHOLES AND CATCH BASINS	11
SECTION 12 - MANHOLE DROP SECTIONS	16
SECTION 13 - TESTING	17
SECTION 14 - BACKFILLING.....	21
SECTION 15 – SURFACE RESTORATION, CLEANUP AND GUARANTEE	22
SECTION 16 - RIP-RAP MATERIALS	23
SECTION 17 - METHOD OF PAYMENT	24

- This page left intentionally blank -

**SPECIFICATIONS
FOR
SANITARY SEWER, STORM SEWER
AND APPURTENANCES**

CITY OF MAPLE GROVE, MINNESOTA

1) GENERAL

The intent of these specification requirements is to provide the requirements for sanitary and storm sewer construction in the City of Maple Grove, Minnesota.

2) LOCATION

The Sanitary Sewer, Storm Sewer and appurtenances to be constructed and installed under this contract are located in the City of Maple Grove, Hennepin County, Minnesota, as shown on the drawings.

3) SCOPE OF WORK

The work to be done under this contract shall include the furnishing of all material, labor, tools, and equipment to construct, complete and in place, the sewer and all appurtenances as shown on the drawings and as specified herein and in accordance with all pertinent requirements of the Minnesota Pollution Control Agency and Minnesota Department of Health.

4) MATERIALS

The materials used in this work shall be new, and conform to the requirements for class, kind, size and material as specified below. Submit in writing a list of materials showing the manufacturer and designation of materials. This list must be approved by the Engineer.

a. REINFORCED CONCRETE PIPE (RCP)

Reinforced concrete pipe and fittings including bends, tee sections and specials shall conform to the requirements of MnDOT Standard Specification for Reinforced Concrete Pipe (3236) and sealed in accordance with MnDOT Standard Plate 3006 and the Standard Specification for Reinforced Concrete Sewer Pipe, ASTM Designation C76 Wall B with circular reinforcing for the class of pipe specified.

Other sizes shall be the pipe class specified on the plans or as recommended by the pipe supplier with approval from the Engineer.

b. REINFORCED CONCRETE BENDS

Concrete pipe bends called for on the plans shall be 7-1/2 pipe bends with a 4'-0" center line laying length with wall thicknesses and steel reinforcing in accordance with ASTM Specifications C76.

c. SANITARY SEWER SERVICE WYES IN RCP

Sanitary sewer service wyes in RCP shall be the core "n" tee rubber boot installed at the factory unless approved by the Owner. Fabricate the rubber boot so as the rubber stop inside the boot that keeps the service pipe from pushing into the mainline falls within the area of the inside wall of the pipe to the area of the outside wall of the pipe. No cast iron bell inserts shall be used.

d. DUCTILE IRON PIPE (DIP)

Design ductile iron pipe for a minimum working pressure of 150 pounds per square inch and shall conform to the applicable dimensions, weights and tolerances of Federal Specification WW-P-421b for cast iron pipe. Ductile iron shall be Grade 60-42-10 with 40/90 metal strength and tested in accordance with ASTM Specification A339-55. Pipe shall be cement lined inside and tar coated outside. The class of ductile iron pipe shall be as specified by the Engineer.

e. POLYVINYL CHLORIDE SEWER PIPE (PVC)

In cuts deeper than 20' use chart below for pipe size and pipe type.

Pipe Size	Pipe Type
8"-15"	SDR 26

In cuts less than 20' use chart below for pipe size and pipe type.

Pipe Size	Pipe Type
8"-15"	SDR 35

The design, dimensions and wall thickness shall conform to ASTM Standard Specifications D-3034. 18" through 48" diameter pipe must conform to AWWA C-905 and Dimension Ratio (DR) 18.

*For 4" through 6" service pipe use Schedule 40 PVC on all depths.

f. CORRUGATED POLYETHYLENE PIPE SEWER

This work shall consist of furnishing and installing dual-wall, smooth interior, corrugated polyethylene pipe and fittings.

(CP) pipe and fittings shall be manufactured from high-density polyethylene (HDPE) virgin compounds. Clean reworked HDPE materials from the manufacturer's own production may be used by the manufacturer of HDPE pipe.

Couplings and Connections shall be made with bell and spigot joints. Bell and spigot joints shall use a gasket if necessary to make the joint soil-tight.

When a watertight joint is specified in the Plans, it shall be required that the joint meet the requirements of ASTM D3212 except as modified. The internal pressure test shall be performed at 68 kPa (10 psi) (minimum) with the pipe in straight alignment. The vacuum test is not required.

Each pipe shall be identified with the manufacturer's name, trade name, or trademark and code from plant location, machine and date of manufacture; nominal pipe size in inches; Ring Stiffness Constant Classification; and ASTM F894.

Pipe to be N-12 as manufactured by Advanced Drainage Systems or Owner approved equal. Pipe lengths shall be 20 foot in length. Pipe shall be cemented into manhole doghouse. All polyethylene pipe crossings shall be minimum of 4 feet in depth otherwise RCP shall be installed.

g. HIGH DENSITY EXTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE (HDPE) PIPE

- i. Thermal Butt-Fusion Method of joining.
- ii. NSF: Standard No. 14.
- iii. PPI Designation: PE 3408.
- iv. Cell Classifications: ASTM D3350-PE 345444C.

- v. Material Description: ASTM D3350-Type III, Grade PE 34.
- vi. Color: Black
- vii. Continuously mark pipe with the following information.
 - i. Size and dimensions
 - ii. Name of manufacturer
 - iii. Cell class
 - iv. ASTM basis
 - v. Pipe test category
 - vi. Plant identification
 - vii. Production data
 - viii. Operator number
 - ix. Resin supplier code
- viii. Manufacturer

All Solid Wall HDPE pipe shall conform to ASTM D3350, D3035, ASTM F714 and AWWA.

h. STEEL CASING PIPE FOR JACKING – BORING

Steel casing pipe for jacking-boring shall conform to ASTM Designation A252, Grade 2 or ASTM Designation A139, Grade B. The casing pipe shall have minimum thickness as follows:

NOMINAL CASING SIZE	OUTSIDE DIAMETER (INCHES)	MINIMUM SHELL THICKNESS (INCHES)
12	12 ¾	.250
14	14	.282
16	16	.282
18	18	.312
20	20	.343
22	22	.375
24	24	.403
26	26	.438
28	28	.469
30	30	.469
32	32	.500
34	34	.532
36	36	.532
38	39	.563
40	40	.563
42	42	.563

5) JOINTING MATERIAL

The jointing material for type of pipe specified here shall be as follows:

a. REINFORCED CONCRETE PIPE

Reinforced concrete pipe joints shall be in accordance with ASTM C443 with pre-lubricated profile type gaskets.

b. DUCTILE IRON PIPE

Ductile iron pipe joints shall be of the push-on type which comply with AWWA Specification C-111 latest revision.

c. POLYVINYL CHLORIDE PIPE

Polyvinyl chloride pipe joints shall be the bell and spigot type using rubber gasket push-on type joints supplied by the pipe manufacturer and installed according to his instructions, for mainline sewer. Shall conform to ASTM D3212.

For polyvinyl chloride pipe joints on service pipe, risers or bends, use the glue on joint as required for Schedule 40 pipe.

d. POLYETHYLENE PIPE

Polyethylene pipe joints shall consist of a bell and spigot type joint with a prelubricated profile gasket meeting ASTM F477 placed on the spigot end. At least two (2) corrugations of the spigot end must insert into the bell end.

6) MANHOLES AND CATCH BASINS

Construct manholes and catch basins using pre-cast sections conforming to or greater than ASTM Specification C478. All manhole section joints shall conform to ASTM C443 with pre-lubricated profile type rubber gaskets including the joint connection for the top section and top slabs for pre-cast catch basin manholes.

Supply sanitary sewer manholes with pre-formed inverts and flexible sleeve connections for lateral lines 15" in diameter or less unless noted on the construction plans. The flexible connection shall be an interpace boot manufactured by Elk River Concrete, Kore-N-Seal Boot

manufactured by North Star Concrete, Royal Concrete Pipe A-lock pipe to manhole connector or approved equal. No speed crete will be allowed for manhole sealing.

Where shown on the drawings, storm sewer manholes may be built using blocks laid up on full mortar beds and completely fill vertical joints filled with mortar. Shape the base of the unit to form a smooth transition section from inlet to outlet formed directly in the concrete or built up of brickwork and mortar.

In sanitary manholes where no mechanical boots are installed, use PVC manhole adaptors that allow a good bond between concrete and PVC as produced by GPK products or an approved equal. The minimum height of a cone section shall be four (4) feet unless approved by the Owner.

a. FRAMES AND COVERS

The standard manhole casting shall be Neenah Foundry No. R1642-B, or approved equal, as shown on the standard plate and have two concealed pick holes. The minimum allowable weight shall be 360 pounds.

The standard catch basin casting shall be Neenah Foundry No. R3067-V and R3067-VB (low points), or approved equal, as shown on the standard plate.

b. MANHOLE STEPS

Make aluminum manhole steps of Apex Ternalloy No. 5 aluminum alloy. Copolymer Polypropylene plastic manhole steps (PS1-PF) may be used or equal.

c. MORTAR

Mortar shall conform to the requirements of MnDOT 2506.B2.

d. PRE-CAST SEGMENTAL BLOCK

8" pre-cast segmental radial block may be used for the lower portion of manhole over large diameter pipe and for shallow manholes and catch basins as approved by the Owner. Concrete used in the manufacture of blocks shall conform to the requirements of ASTM C139 "Specifications for Concrete &

Masonry Units for Construction of Catch Basins & Manholes". Plaster the exterior of block manholes with one-half inch (1/2") of mortar.

e. CONCRETE

Concrete used shall be composed of a mixture of fine and coarse aggregate and a Portland Hydraulic Cement conforming to the ASTM Specification Designation C-150, Type 1, with the proper water-cement ratio to obtain a concrete testing not less than 3,000 pounds per square inch in 28 days.

7) EXCAVATION AND TRENCH PREPARATION

a. CLASS OF BEDDING

Class B, C-1, or C-2 bedding as shown on the standard detail plate SS-14 & SS-15, shall be used as directed on the plans or specified in the special provisions. Bed PVC pipe in accordance with the specifications described below. Special bedding shall be in accordance with the special provisions.

i. POLYVINYL CHLORIDE PIPE (PVC) SEWER PIPE.

Install and bed PVC pipe in accordance with ASTM Specification D-2321, and as shown in standard plate SS-15.

ii. POLYETHYLENE PIPE

Backfill shall consist of native or select type A, B or C granular material as outlined in ASTM D-2321.

iii. ACHIEVE CLASS B CLASS BEDDING

Compacted backfill in the "pipe zone". Bed the pipe in compacted crushed rock or pea gravel placed on a flat trench bottom. The bedding shall have a minimum thickness of 1/4 the outside pipe diameter and extend halfway up the pipe barrel at the sides. Fill the remainder of the side fills and a minimum depth of twelve inches (12") over the top of the pipe with compacted granular selected material.

iv. ACHIEVE CLASS C BEDDING

Shall be achieved by bedding the pipe with care in an earth foundation formed in the trench bottom by a shaped excavation which will fit the pipe barrel with for a width of at least 50% of the outside pipe diameter. Fill the sides and area over the pipe to a minimum depth of six inches (6") above the top of the pipe with compacted normal fill material.

b. CORRECTING FAULTY GRADE

Correct part of the trench excavated below grade with approved material and thoroughly compact without additional compensation.

c. PIPE FOUNDATION IN POOR SOIL

If, in the opinion of the Contractor, the material below the pipe is too soft to adequately support the pipe, the Contractor shall immediately inform the Engineer. When the bottom at subgrade is soft and in the opinion of the Engineer or representative of the Owner, cannot adequately support the pipe, excavate a further depth and/or width and refill to pipe foundation grade with approved material and thoroughly compact to assure a firm foundation for the pipe with extra compensation allowed as provided elsewhere in these specifications.

8) LAYING OF PIPE

Plug the downstream invert of the first existing manhole downstream of the pipe under construction until the system is finalized. Proceed pipe laying with the tongue or spigot ends pointed in the direction of flow. The laying of pipe shall conform to the class of bedding specified. Pipe shall not be laid in water or when the trench conditions are unsuitable for work except by written permission of the Engineer. Complete the excavation of trenches a sufficient distance in advance of the pipe laying and protect the exposed ends of all pipe with a board or approved stopper to prevent earth or substances from entering the pipe.

Carefully clean the interior of the sewer from dirt, cement, or superfluous material of every description as the work progresses. If necessary,

thoroughly flush pipe at the completion of the work at the expense of the Contractor as directed by the Engineer.

a. PIPE ALIGNMENT AND GRADE

Lay and maintain pipe to the required lines and grades, with manholes, catch basins and fittings at the required locations. The owner will furnish one set of line and grade stakes for the work. It shall be the Contractor's responsibility to preserve stakes from loss or displacement. The Engineer may replace stakes he

b. TYPE, SIZE AND CLASS OF PIPE

The type, size and class of pipe installed shall be in conformance with that specified. 12" reinforced concrete pipe is not allowed for storm sewer unless approved by the Owner.

c. CLEANING PIPE

Remove foreign matter or dirt from the inside of the pipe before it is lowered into position in the trench, and keep clean by approved means during and after laying..

d. GRADE CONTROL

Maintain the line and grade of the pipe in the trench by laser method. If the laser is correctly set and the error is yet apparent, notify the Engineer immediately so that the staking may be checked.

9) SANITARY SEWER SERVICE HOUSE CONNECTIONS, WYES

As indicated on the plans and at points as deemed necessary, install six inch (6") or four inch (4") HWS SDR 26 wyes with Schedule 40 glue on branch for house connections in the center of each lot unless otherwise specified. Fernco fittings will not be allowed. All sewer bends and service risers shall be heavy wall pipe such as Schedule 40. If necessary, a 45° bend shall be installed to bring the end of the service to the elevation of the water curb stop or 7-1/2 feet below grade. Make the joints and bedding as previously specified. Cap the end of the service pipe and openings to wye and/or tee branches to prevent water from entering the service until the connection is placed in service.

a. RECORD AND LOCATION OF SERVICE CONNECTIONS

It shall be the duty of the Contractor to cooperate with the Owner to keep accurate records of service connections to location, depth to top of riser, type of connection provided, etc. Locate to the nearest downstream manhole from the service. Turn this record over to the Engineer for his records at time intervals specified by the Engineer. All services, bends, tees or connections shall have a GPS shot of their location done by the Contractor within the tolerance of 4" (inches).

At the end of house connections, furnish and set a two inch by two inch (2"x2") wooden marker stake set vertically extending from the invert of the service stub to two feet (2') above the ground surface.

10) SUMP DRAIN CLEANOUT, AND SUMP DRAIN INLET

This shall include all work necessary to provide sump pump drains as indicated in the plan. This work shall include, but not be limited to all equipment, labor, and materials necessary to complete the work as specified.

Cleanouts shall be installed at all dead ends, on all services, directly behind the catch basin after the bends and locations in lengths of pipe greater than 200-ft for maintenance purposes.

When the mainline is attached to the catch basin or manhole a rodent guard that swivels up to allow trash to pass through shall be installed.

Services installed under roadways shall be insulated with 4" insulation (4'x8'x2" sheets). Granular bedding shall be used under the insulation where clay soils exist.

Service inlets shall include a 1.5' stub beyond the curb or walk (whichever is greater) and capped and marked as indicated on Standard Plate STS-9. Services shall include the tee, pipe, cap and marker.

Any tees or bends installed with the main line piping shall be incidental mainline pipe drain.

Tracer wires shall be laid with the pipe and shall be #12 AWG Solid (0.0808" diameter), 21% conductivity copper-clad hard drawn high carbon steel extra high strength horizontal directional drill tracer wire, 1150 pound average tensile break load, 45mil. The conductor insulator shall consist of a high molecular weight-high density yellow polyethylene jacket complying with ASTM-D-1248, 30 volt rating. Termination of the tracer wire shall be at all clean outs and storm sewer structures. The tracer wire shall be incidental to the sump drain installation.

The terminations shall reflect Standard Plate STS-8 tracer wire access box and shall be installed 3"-6" below finish grade elevation. When connecting near a catch basin, the termination cap will be 3"-6" behind the back of curb line and in the middle of the 2x3 casting. The Contractor shall provide Valvco type tracer wire access box as approved by the Engineer. This work shall be considered incidental.

Tracer Wires shall be tested for electrical continuity. The electrical test shall be made after the entire sewer has been installed and connected at both ends. If the test is a failure the contractor shall make the corrected measures as directed by the engineer and be at no cost to the owner.

Drilled or preformed holes in the drainage structure are required for all connections to minimize structure damage. In addition, the joint is to be mortared both inside and outside of the structure wall where the drainpipe goes into the structure. Rodent screens will be provided at all open ends (i.e. in structures) of the pipe drain. This work shall be considered incidental.

11) SETTING MANHOLES AND CATCH BASINS

a. LOCATION

Locate manholes and catch basins as shown on the Drawings or as directed by the Engineer.

b. CONSTRUCTION DETAILS

The details of construction of individual structures shall conform to the drawings and specifications.. Construct the bottom of manholes of half section of equivalent size pipe shaped to conform to the inlet and outlet pipe to allow an uninterrupted flow.

C. ADJUSTING RINGS AND BLOCKS

Manhole frames and covers shall be set to the designated elevation in a full mortar bed where concrete adjusting rings are approved for use. A concrete collar shall be poured around adjusting rings used to set frames for catch basins. Provide no less than two (2) – two inch (2") adjusting rings and no more than fourteen inches (14") of adjusting rings between frame casting and precast manhole top slab or cone. See standard plate SS-8 for more details.

The final adjustment may be made with a ductile iron adjusting ring but the manhole casting must be sandblasted and ductile ring glued to the casting.

d. Cretex PrO-Ring

i. GENERAL

This specification defines the materials required for the adjustment of all manholes, catch basins or other underground utility structures to final elevation as shown on the project drawings for sections of street with an ADT of 5,000 or greater or on sections of road approved by the engineer in the Special Provisions.

1. WORK REQUIRED

Grade adjustment rings meeting the requirements of this section shall be used to adjust and support the frame and cover or grate to the specified final elevation on all manholes, catch basin or other utility structures.

2. SYSTEM DESCRIPTION

Design Requirements – The grade adjustment rings shall be designed to allow final adjustment of the frame and cover or grate to the grade established by the ENGINEER on the project drawings. The rings shall also be designed to accommodate flat or sloping surfaces to within approximately ¼" (one quarter inch) to ½" (one half inch) of the specified final elevation. The grade adjustment system shall have a minimum 50 (fifty) year design life.

Performance Requirements – The grade adjustment rings shall be capable of supporting the minimum

requirements of ASSHTO H-25 and HS-25, be UV stable and be resistant to chemicals and corrosion commonly associated with the sanitary and storm sewer environments.

3. SUBMITTALS

Test Report – A test report from an approved third party testing agency showing the grade adjustment rings meets the minimum requirements of ASSHTO H-25 and HS-25.

Certification – The manufacturer of the grade adjustment rings shall provide certification to the ENGINEER stating that the product meets the design life and material requirements of this specification.

ii. PRODUCTS

MANHOLE AND CATCH BASIN GRADE ADJUSTMENT RING

Manhole and catch basin grade adjustment rings shall consist of a variety of heights (thicknesses), diameters and shapes all conforming to the following requirements:

1. Grade Adjustment Rings – The grade adjustment rings shall be manufactured from ARPRO® Expanded Polypropylene (EPP), black, 5000 series meeting ASTM D3575. The rings shall be manufactured using a high compression molding process to produce a finished density of 120 g/l ((7.5 pcf).
2. "Grade" adjustment rings may contain either an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside with a flat top.
3. "Finish" or "Flat" rings may either have a keyway (groove) on the underside for vertical alignment and/or an adhesive trench with a flat upper surface. These rings shall be available in heights (thicknesses) which will allow final adjustment of the frame and cover or grate to within ¼" (one quarter inch) to ½" (one half inch) of the specified final elevation.

“Finish” rings may also have a keyway on the upper surface of the inner diameter to facilitate installation of an “Angle” ring.

4. “Angle” rings may either have an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside. When required, the “Angle” ring or rings shall allow final adjustment of the frame and cover or grate to within $\frac{1}{4}$ ” (one quarter inch) to $\frac{1}{2}$ ” (one half inch) of the specified final elevation.
5. Acceptable Manufacturer – PRO-RING™ by Cretex Specialty Products

iii. EQUIPMENT

The contractor shall have the required tools and equipment necessary to facilitate proper installation of the grade adjustment rings.

1. ADHESIVE SEALANT

Any adhesive or sealant used for watertight installation of the manhole grade adjustment rings shall be M-1 Structural Adhesive/Sealant or equal meeting the following specifications:

ASTM C-920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A and O Federal Specification TT-S-00230-C Type II, Class A

Corps of Engineers CRD-C-541, Type II, Class A
Canadian Standards Board CAN 19, 13-M82

AAMA 802.3-08 Type II, AAMA 803.3-08 Type I and AAMA 805.2-08 Group C

Other adhesives or sealants may only be used with engineer or owner's written authorization.

2. REPAIR MORTAR

Repair mortar shall be a one component, quick set, high strength, non-shrink; polymer modified cementitious patching mortar, which has been formulated for vertical or overhead use meeting the requirements of ASTM C-109 for Compressive Strength, C-348 and C-78 for Flexural Strength and C-882 for Slant Shear Bond Strength. Repair mortar shall not contain any chlorides, gypsums, plasters, iron particles, aluminum powder or gas-forming agents nor shall it promote the corrosion of any steel that it may come in contact with.

3. CEMENTITIOUS GROUT

SCOPE

Cementitious grout shall be a premixed, non-metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRD-C-588 and C-621. When mixed to a mortar or "plastic" consistency, it shall have minimum one day and 28 day compressive strength of 6,000 and 9,000 psi, respectively.

iv. EXECUTION

1. INSTALLATION

Installation and surface preparation shall be in accordance with the manufacturer's instructions. The joint between the first grade ring and top of the manhole, catch basin or utility structure shall be sealed using an adhesive/sealant meeting the requirements of Section 2.03.

If the top of the manhole, catch basin or utility structure is not level or is irregular, then a non-shrink repair mortar meeting the requirements of Section 2.04 or non-shrink cementitious grout meeting the requirements of Section 2.05 shall be used. A bed of the specified mortar or grout shall be placed on the top surface of the utility structure and then the first grade ring shall be embedded and leveled into the bed of material.

The remaining joints between all manhole adjustment rings and the frame and cover or grate shall be sealed using an adhesive/sealant meeting the requirements of Section 2.03.

No other materials shall be used in the construction of the grade adjustment area beyond those specified above. Prohibited materials include, but are not limited to wood or wood shims of any kind, concrete, brick, block, stones, etc.

The use of any heat shrinkable chimney seals shall not be permitted.

12) MANHOLE DROP SECTIONS

Construct manhole drop sections where shown on the plans according to the detail drawings. No inside drops shall be allowed unless approved by Owner. Install pipes to match flow lines unless an outside drop is constructed.

Drop manholes shall be protected from corrosion by one of the following ways:

a. NEW CONSTRUCTION

i. EMBEDDED LINER

Manhole walls shall be lined with GSE Studliner as manufactured by GSE Environmental, AGRU Sure Grip, or AMER-PLATE T-LOCK as manufactured by Ameron, Inc.

b. EXISTING CONSTRUCTION

i. SPRAY ON POLYMORPHIC RESIN

Effectively protect the exposed concrete surfaces from corrosion in those areas shown on the drawings or specified. The liner shall be continuous and free of pinholes at the joints and in the liner itself.

All work for and in connection with the installation of the lining, field seaming and welding of joints shall be done in

strict conformity with all applicable instructions and recommendations of the liner manufacturer.

C. RISER PIPE

The risers for drop manholes shall consist of D.I.P. or SDR 35 PVC with size matching that of the incoming upstream pipe.

13) TESTING

An infiltration test, where applicable and a low pressure air test will be required on sanitary sewer construction. Consider the cost of testing incidental to the contract project.

a. TESTING OF SEWER LINES PRIOR TO STREET CONSTRUCTION

Complete and have testing accepted on sewer lines prior to the commencement of street construction. Access to the manholes for air testing and lamping will be the Contractor's responsibility.

The Contractor shall notify the Engineer and the City Utility Department 24 hours prior to testing of utilities. The Engineer or a representative from the City Utility Department must witness all utility testing.

b. LOW PRESSURE AIR TESTING

Upon completion of the sewer and before house services are connected to the pipe line, after the line has been backfilled and cleaned, furnish equipment and personnel to conduct a "pipe line acceptability test" using low pressure air. Perform this test between two manholes in succession.

Seal the pipe line with plug whose sealing length is greater than the diameter of the pipe and constructed in a nature that will maintain a seal against the line's test pressure. Cap and brace all wyes, tees, outlet or ends of lateral services to withstand the internal pressures. Caps or plugs shall be easily removable.

Tap one plug for the air supply hose and the return air pressure hose. The air supply hose, connected from the compressor to the plug, shall have a throttling valve, bleeding valve and shut off valve for control. The air pressure tap shall have a sensitive

pressure gauge, 0 to 10 psi range, protected by a gauge cock and a pressure relief valve set at 10 psi.

Add air slowly to the pipe line until pressure inside the pipe line reaches 4.0 psig. If air is added too rapidly, the test accuracy will decrease because a change in temperature also has an effect on the change in pressure. When the air pressure inside the pipe line reaches 4.0 psig above the external hydrostatic pressure the supply air is stopped. Allow a time interval for the temperature difference to stabilize before the actual test is performed. If the air pressure drops below 3.5 psig during this time interval, supply more air to the pipe line and throttle to maintain a pressure between 3.5 psig and 4.0 psig for a minimum of two minutes after which time the supply air will be shut off.

The portion of line being tested shall be accepted if the portion under test does not lose air at a rate greater than 0.003 cfm per square foot of interval pipe at an average pressure of 3.0 psig greater than back pressure exerted by ground water that may be over the pipe at the time of test.

Accomplish the test by determining the time in minutes for the pressure to decrease from 3.5 psig to 2.5 psig greater than the average ground water that may be over the pipe. That time shall not be less than the time shown for the diameter in the following table.

Pipe Diameter in Inches	Minutes
4	1.9
6	2.8
8	3.8
10	4.7
12	5.7
15	7.1
18	8.5
21	9.9

If the pipe line fails to meet the requirements of the test, the Contractor shall, at his expense, determine the source of leakage then repair or replace defective material and/or workmanship.

In determining the pressure greater than the average ground water the ground water height in feet above the pipe line must

be measured. When the water elevation has been established, divide the height in feet above the pipe line by 2.31 and that pressure added to gauge pressure of test.

A table for converting water height to gauge pressure is as follows:

Ground Water Level Over Top of Pipe Line	Added Pressure to be Applied to Gauge Pressure Readings
1 Foot	0.43 psig
2 Feet	0.86 psig
3 Feet	1.29 psig
4 Feet	1.72 psig
5 Feet	2.16 psig
6 Feet	2.59 psig
7 Feet	3.01 psig
8 Feet	3.44 psig
9 Feet	3.87 psig
10 Feet	4.30 psig

C. INFILTRATION TEST

If infiltration is detected the contractor shall supply all materials and labor to conduct an infiltration test. The maximum allowable rate of leakage shall be 100 gallons per inch of diameter of pipe per mile for 24 hours.

d. DEFLECTION TEST

The deflection will be checked by means of televising prior to final acceptance of the sanitary sewer and storm sewer lines. Deflections greater than 7.5% of the inside diameter of the pipe shall be considered failure of the bedding procedure. For deflections between 7.5% and 10.0% the Contractor shall have the option of:

- i. Determining the extent of the deflections and accepting a reduced payment in accordance with the schedule shown below:

OR

- ii. The Contractor shall be required to re-excavate the trench, re-compact the backfill material and restore the surface at

no additional compensation with the re-laid pipe meeting the 7.5% requirement.

Correct deflections greater than 10.0% in accordance with Option 2 stated above. The payment reduction, if exercised, will be applied to the entire length of the pipe between the manholes in which the deflection between 7.5% and 10.0% occurs.

Deflecting	% Reduction in Payment
Less than – 7.5%	0%
7.5% - 8.5%	5%
8.5% - 9.0%	10%
9.0% - 9.5%	15%
9.5% - 10.0%	20%
Greater than 10%	Pipe will be re-laid

e. ADJUST MANHOLE AND TELEVISIONING

All manholes and castings in paved areas shall be located within 24 hours after paving the non-wear course. All castings shall be raised and adjusted to grade and the sewer lines shall be cleaned within 10 calendar days after placing the bituminous base course. These interim adjustments of appurtenances located within the street shall be between 1/4" and 1/2" below the pavement surface. Interim adjustments are required on all appurtenances located in areas where the permanent wear course will not be paved until the following construction season.

The contractor shall notify the Owner by written documentation when the sewer lines have been completed and cleaned as specified. The Owner will schedule the sanitary sewer lines to be televised after written notification from the Contractor of all completed work to the Sanitary Sewer System. The Owner will schedule and pay for the televising of the sewer lines the first time. However, if the Contractor has not completed the raising, adjusting, cleaning, setting castings and all work, a \$500.00 per day penalty will be imposed on the Contractor until such work is complete. If the initial televising fails in any way, the Contractor will pay 100% of the resulting televising required until final acceptance by the Owner.

14) BACKFILLING

Backfill excavation in trenches to the original ground surface or to grades as specified or shown on the plans. Begin the backfilling as soon as practicable after the pipe has been placed. Prior to backfilling, clean the excavation of trash, debris, organic material, and undesirable material. Backfill trenches every night prior to leaving job site. Trenches may be left open with appropriate protection with approval by the Engineer and Owner.

a. BACKFILL PROCEDURE AT THE PIPE ZONE

Backfill and compact as thoroughly as possible to prevent after settlement. Deposit the backfill so the shock of falling material will not damage the pipe or structures. Grade over and around parts of the work as directed by the Engineer.

Deposit suitable material determined by the Engineer, free from rocks and boulders, deposited in the trench simultaneously on both sides of the pipe for the width of the trench to a height above the top of the pipe as specified. Shovel place and hand tamp the pipe bedding material to fill spaces under and adjacent to the pipe. A jumping jack is required to be used along the length of the pipe on both sides. If natural, suitable, granular material is not encountered during the excavation of the trench, or when the material is determined unsuitable by the Engineer, for backfilling around the pipe as required above; provide and place approved material from other sources.

b. BACKFILL PROCEDURE ABOVE THE PIPE ZONE

Unless specified, furnish suitable backfill material and use the following backfill procedures above the "pipe zone" to the existing surface elevation or design grade, as specified

Backfill the trench to obtain compaction, with the lift thickness as required with a maximum of one foot (1') lifts. Compact the backfill material to 95% of the standard moisture density relationship of soils (ASTM D698-70) except the top three feet (3') of the trench which shall be compacted to 100% density.

Backfilling of utilities installed down lot lines shall require material to be compacted to 100 percent of the standard moisture density relationship of soils regardless of depth.

Consider settlements greater than one inch (1") measured with a string line from one edge of the settlement to the other within the warranty period of this contract failure of the mechanical compaction and repair street surfaces, driveways, and boulevard and ditch areas at no cost to the City.

c. DISPOSAL OF EXCESS MATERIALS AND DEBRIS

Unless specified, dispose of excavated material not suitable or not required for fill material within the project limits at the Contractor's expense. If the Engineer deems there is no area in the project limits to dispose of excess material, he shall direct the Contractor to dispose of material off site in a manner subject to the provisions of the following paragraph and the Contractor will be compensated in accordance with the bid unit price in the contract.

Before dumping materials or debris on a private or public land, the Contractor must obtain from the owner of land written permission for dumping and a waiver of claims against the owner for damage to land which may result together with permits required by law for dumping. File a copy of permission, waiver of claims and permit with the Engineer before disposal is made.

d. DENSITY TEST

Density tests will be performed by an approved soils testing firm at locations and depths throughout the project as directed by the Engineer. Cooperate and provide assistance as necessary to complete these tests with no additional compensation to the Contractor.

Testing costs pertaining to passing tests shall be paid for by the Owner. Testing costs pertaining to failing tests will be charged to and paid for by the Contractor.

15) SURFACE RESTORATION, CLEANUP AND GUARANTEE

a. RESTORATION OF SURFACE

Return surfaces disturbed during the construction period to its original condition or better.

b. MAINTENANCE OF STREET UNTIL SURFACED

After backfilling according to the above specifications, maintain the streets as required and blade as necessary to provide a passable surface for traffic until the surfacing is completed or to the date of final acceptance.

c. CLEANING UP

Remove surplus pipe material, tools, and temporary structures and dirt or rubbish caused by Contractor's operations and haul excess earth from excavations to a dump provided by the Contractor, and the construction site in a condition satisfactory to the Engineer.

d. GUARANTEE

The Contractor shall be held responsible for defects in workmanship and materials which may be developed in part of the installation furnished by him and immediately replace upon written notice from the Engineer and make good, without expense to the owner, faulty part or parts and damage done during the period as prescribed in Section 7.8 of the conditions of the contract.

e. FAILURE TO REPLACE DEFECTIVE PARTS

Should the Contractor fail to make good the defective parts within a period of 30 days of written notification the Owner may replace these parts, charging the expense to the Contractor.

16) RIP-RAP MATERIALS

Furnish and install rip-rap as designated by the plans and per Standard Plate STS-7 or as directed by the Engineer to prevent the possibility of erosion. If the rip-rap is not placed per the Standard Plate or by the direction of the Engineer, no payment will be made until it has been corrected and to the Engineers satisfaction.

a. RIP-RAP MATERIALS

The rip-rap material shall conform to Minnesota Department of Transportation Standard Specifications 3601. Field stones may be also be used when approved by the Owner.

b. FILTER BLANKET MATERIAL

Filter blanket material shall conform to MnDOT Spec. 3601.2H, and be placed beneath the rip-rap material at storm sewer outlets.

c. LINER MATERIAL

Place Type 1 geotextile fabric beneath the filter blanket material at storm sewer outlets as described on the standard plate. Liner material shall conform to MnDOT Spec. 3733.

17) METHOD OF PAYMENT

The work shall be measured and the compensation determined in the following manner:

a. SEWER PIPE

Sewer pipe shall be paid for at the contract price per lineal foot, measured from center of manhole to center of manhole, connection to manhole or manhole to the end of the line as specified and shall include the cost of furnishing and installing pipe, pipe bend sections, jointing material, and bedding material at the depth specified. Lengths will be measured in a horizontal plane unless the grade of the pipe is more than 15%. The depth of cut for payment is the distance between the invert of the pipe at a point and the intersection of a vertical or plumb line extended from the point to the intersection of the line with the ground surface as exists at time of construction.

b. MANHOLES

The standard manholes and drop manholes shall be paid for at the contract unit price per each for the depth of 0-8 feet. Payment shall include the cost of furnishing and installing tees, pre-cast sections, sewer block, concrete slabs, adjusting rings, mortar, castings, water proofing, and jointing, excavating, backfilling and dewatering at the depth specified when a bid item is provided, additional payment will be made for manholes installed at depths greater than eight feet (8') at the contract unit price per lineal foot. Manhole over depth shall be measured from the invert of the sewer to the point of eight feet (8') below the rim elevation.

c. Adjusting Manholes

Interim adjustments are required on all manhole castings located in areas where the permanent wear course will not be paved until the following construction season. All interim adjustments are considered incidental.

Manholes requiring an additional adjustment to prior to installation to the final wear course will be paid for at the contract unit price per each.

C. RISERS FOR DROP MANHOLES

The riser pipe, including pipe support, for drop manholes will be paid for at the contract unit price per lineal foot. Length of riser shall be computed as distance from tee invert to invert of lowest pipe entering manhole.

d. WYES, TEES AND SPECIAL FITTINGS

Wyes, tees and special fittings will be paid for at the contract price per each. Tees required for drop manholes are considered incidental to the drop section.

e. CATCH BASINS

Catch basins will be paid for at the contract unit price per each, including base and casting and adjusting rings.

f. FLARED END SECTION IN PLACE

End sections will be paid for at the contract unit price per each for size furnished including placing costs and trash guard. Flared end sections will not be included in the lineal footage of pipe measured.

g. RIP RAP MATERIALS

Rip-rap materials will be paid at the contract unit price per cubic yard. Payment shall include the filter blank and geotextile fabric at the flared end section per Standard Plate STS-7.

h. FOUNDATION MATERIAL

Material used for refilling to pipe foundation grade to assure firm foundation for pipe shall be paid for at the contract unit price per linear foot in 6" depth increments in place regardless of width. Payment shall include cost of excavation and placement.

[END SANITARY SEWER, STORM SEWER]

**SPECIFICATIONS
FOR
PLANT MIXED BITUMINOUS CONSTRUCTION**

CITY OF MAPLE GROVE, MINNESOTA

**TABLE OF CONTENTS
January 2016**

<i>TABLE OF CONTENTS</i>	<i>PAGE #</i>
SECTION 1 - GENERAL.....	1
SECTION 2 - LOCATION	1
SECTION 3 - SCOPE OF WORK.....	1
SECTION 4 - MINNESOTA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS WHICH APPLY	1
SECTION 5 - NOTIFICATION TO PROPERTY OWNER.....	2
SECTION 6 - METHOD OF PROCEDURE.....	2
SECTION 7 - TESTING OF MATERIALS	3
SECTION 8 - 2360 PLANT-MIXED ASPHALT PAVEMENT.....	4
SECTION 9 - BASIS OF PAYMENT	4

- this page left intentionally blank -

**SPECIFICATIONS
FOR
PLANT MIXED BITUMINOUS CONSTRUCTION

CITY OF MAPLE GROVE, MINNESOTA**

1) GENERAL

The General Conditions and the Special Provisions and Conditions as embodied in these Contract Documents shall be applied to all work and materials to be furnished and installed under these specifications.

2) LOCATION

The plant mixed bituminous shall be constructed and installed under this contract located in the City of Maple Grove, Hennepin County, Minnesota, as shown on the drawings.

3) SCOPE OF WORK

The work to be done under this contract shall include the furnishing of all material, labor, tools, and equipment to construct, complete in place, the plant mixed bituminous surfacing as shown on the drawings and as specified herein.

4) MINNESOTA DEPARTMENT OF TRANSPORTATION SPECIFICATIONS WHICH APPLY

Those portions of the State of Minnesota Department of Transportation Specifications for Construction, 2016 Edition, and all subsequent supplemental specifications are incorporated herein by reference and are made a part of the contract as fully as though set out herein at length, and shall apply to this contract except as modified in the Special Provisions and Conditions, together within any sections referred to in said section or necessary for proper interpretation or use.

The word City shall be substituted for the word State wherever it appears and shall mean the City of Maple Grove, Minnesota.

5) NOTIFICATION TO PROPERTY OWNER

The Contractor shall provide 24 hour notice to the property owner before any driveway is blocked and give them sufficient time to move their vehicles. No driveway shall be blocked longer than necessary for construction and only as approved by the Owner.

Access to existing businesses shall be maintained at all times. When construction is directly impacting business driveways and entrances, work shall be done continuously and as promptly as possible to return the driveway entrance to a finished surface. The contractor shall exercise care to minimize impacts to business parking facilities.

6) METHOD OF PROCEDURE

Prior to the start of any work, the Contractor shall submit in writing to the Owner for approval, a schedule of procedure, which shall be followed as closely as possible. Where problems as to coordination and completion may appear to exist, the Owner may require modifications therein. Once work has started on a street it must be diligently pursued until the street is finished. Each successive phase of work shall follow the preceding phase as closely as possible so that the time anyone street is under construction is kept to a minimum.

Should the Contractor, in the Owner's opinion, fail to complete the work as specified above, the Owner may limit the work which has been started but not completed to any such amount as the Owner deems reasonable. No extension of time shall be granted to the Contractor for not being permitted to open new street to construction for this reason.

a. PLACEMENT OF TACK COAT

The application rate for Bituminous Tack Coat Material shall conform to MnDOT section 2357.3 D and table 2357-2.

The Contractor shall protect adjacent curb and gutter, sidewalk and other expose surfaces from over spraying during the application process. If overspray occurs, the Contractor shall clean to the satisfaction of the Owner.

In addition to the overall traffic control requirements, the Contractor shall be responsible for traffic control during placement of the tack coat and while the tack coat is exposed prior to paving operations. Removal of tack coat on

vehicles or driveways as a result of substandard traffic control operations shall be the responsibility of the Contractor at no cost to the City or owner of the vehicle or driveway.

b. Placement of Bituminous Layers

Obtain compaction by the specified density method as per the current Minnesota Department of Transportation specification to achieve a degree of compaction no less than 95% of the Marshall density as determined for "job mix" formula.

7) MATERIALS: SPECIFICATION, SAMPLES, TEST AND ACCEPTANCE

Compaction testing will be performed for the Owner by an independent testing laboratory (Northern Technologies, Inc.) The cost of passing tests will be paid by the Owner and the Contractor shall pay for all failing test and the retest.

The provisions of MnDOT 1603 and the most current version of the MnDOT Schedule of Materials Control will be the basis for all Quality Control testing performed by the Contractor as part of the Contract Work. In addition, the following testing rates and requirements will be utilized for street and utility construction work as part of Quality Assurance testing by the Owner and shall be performed by Northern Technologies Inc. (NTI). NTI can be contacted at (763) 433-9175

Bituminous Testing				
Testing Location	Project Type	Sampling Responsibility	QA Testing Frequency	Reference Specification
Mix Sampling – Field / Placement	All Projects	Owner's Testing Representative ¹	1 per day per mix design	MnDOT 2360
All Courses Below Wear – Maximum Density Specification	All Projects	Owner Marks Core Location, Contractor Performs Coring	Varies Based on Tonnage	MnDOT 2360.3.D.1
Wear Course – Ordinary Compaction	All Projects	Owner's Testing Representative ¹	Varies Based on Tonnage	MnDOT 2360.3.D.2

¹ For samples at plant and in the field, the Contractor may be requested to take companion sample for Owner's testing. Owner will provide containers for sampling.

8) 2360 PLANT MIXED ASPHALT PAVEMENT

MIX DESIGNATION Numbers for the bituminous mixtures are as follows unless otherwise indicated in the Plans and Specifications:

Wearing course for residential roadways – SPWEA230B

Non-Wearing course for residential roadways – SPNWB230B

Wearing course for driveways and paths – SPWEA240B

9) BASIS OF PAYMENT

Payment for the accepted quantities of asphalt mixture used in each course at the Contract prices per unit of material shall be compensation in full for all costs of constructing the asphalt surfacing as specified, including the costs of furnishing and incorporating any asphalt binder, Mineral filler, hydrated lime, or anti-stripping additives that may be permitted or required.

The Contractor is responsible to complete yield checks and monitor thickness determinations so that the constructed dimensions correspond with the required Plan dimensions throughout the entire length of the project. The tolerances for lift thickness shown in MnDOT 2360E, Thickness and Surface Smoothness Requirement is for occasional variations and not for continuous overrunning or under-running, unless ordered or authorized by the Engineer.

The provisions of MnDOT 1903 are modified to the extent that the City shall not make a price adjustment in the event of increased or decreased quantities of asphalt mixture items. Payment for plant mixed asphalt surface shall be made on the basis of the following schedule:

Item No.	Item Unit
2360.503 Type SP* Wearing Course Mixture (1, 2)	square yard
2360.503 Type SP* Non Wearing Course Mixture (1, 2).....	square yard
2360.503 Type SP* Bituminous Mixture for Specified Purpose.....	square yard
2357.502 Bituminous Material for Tack Coat.....	gallon

(1) Traffic Level Designation in accordance with Table 2360-1, "Traffic Levels"

(2) AC binder grade designation (Table 2360-2)

* Aggregate size Designation, 9.5, 12.5 or 19 as appropriate, see 2360.1.A.3

[END PLANT MIXED BITUMINOUS CONSTRUCTION]

SPECIFICATIONS
FOR
GRADING, LANDSCAPING & TRAFFIC CONTROL
CITY OF MAPLE GROVE, MINNESOTA
TABLE OF CONTENTS
January 2016

TABLE OF CONTENTS	PAGE #
SECTION 1 - DESCRIPTION	1
SECTION 2 - MATERIALS	1
SECTION 3 - SAMPLES, TESTING AND ACCEPTANCE.....	5
SECTION 4 - AGGREGATE BASE	6
SECTION 5 - EXCAVATION AND EMBANKMENT	8
SECTION 6 - PROOF ROLLING	10
SECTION 7 - NOTIFICATION TO PROPERTY OWNER	10
SECTION 8 - PROTECTION OF UTILITIES	11
SECTION 9 - PROTECTION OF EXISTING DRIVEWAYS, CURBS AND SIDEWALKS	11
SECTION 10 - PROTECTION OF IRRIGATION AND PET CONTAINMENT SYSTEMS	11
SECTION 11 - CLEANING OF CATCH BASINS, MANHOLES AND GATE VALVES	12
SECTION 12 - DUST CONTROL	12
SECTION 13- TURF ESTABLISHMENT	13
SECTION 14 - TREE REMOVAL	16
SECTION 15 - CLEAN ROOT CUTTING	17
SECTION 16 - LANDSCAPE ROCK.....	17
SECTION 17 - MAIL BOXES	17
SECTION 18 - TRAFFIC SIGNS AND DEVICES.....	17

- this page left intentionally blank -

**SPECIFICATIONS
FOR
GRADING AND LANDSCAPING
CITY OF MAPLE GROVE, MINNESOTA**

January 2016

1. DESCRIPTION

This work shall consist of the excavation, backfilling, and restoration of existing surface improvements for the purposes of installing new and/or relocating or adjusting existing underground utilities.

Use of the term "Plans, Specifications and Special Provisions" within this specification shall be construed to mean those documents which compliment, modify, or clarify these specifications and are accepted as an enforceable component of the Contract or Contract Documents. All references to MnDOT Specifications shall mean the latest published edition of the Minnesota Department of Transportation Standard Specifications for Construction, as modified by any MnDOT Supplemental Specification edition published prior to the date of advertisement for bids. All reference to other Specifications of AASHTO, ASTM, ANSI, AWWA, etc. shall mean the latest published edition available on the date of advertisement for bids.

2. MATERIALS

a. SELECT GRANULAR MATERIAL

Use MnDOT Specification 3149.2B aggregate for select granular material and specified under the pipe bedding classification or an equivalent natural granular soil.

b. FINE GRANULAR FILL MATERIAL

Material shall consist of sound durable particles without cohesion of clean sand and/or well rounded gravel. The largest size of gravel used shall depend upon the size of the pipe used. Use a maximum of three-eighths inch (3/8") gravel when the pipe diameter exceeds 24".

c. CLASS 4 AND CLASS 5 SAND AND GRAVEL

Class 4 and Class 5 sand and gravel shall be in conformance with MnDOT Specification 3138.

d. CRUSHED ROCK

The material shall consist of durable crushed quarry rock which 100% passes a two inch (2") sieve and which 95% is retained on a #4 sieve size. It shall not contain soil overburden, sod, roots, plants, and other organic matter, or other materials considered objectionable by the Engineer.

e. PIT RUN GRAVEL

The material shall consist of sound, durable particles of gravel and sand which may include limited amounts of fine soil particles as binding material, and which 100% passes a two inch (2") sieve and which 90% is retained on the #200 sieve size. It shall not contain sod, roots, plants and other organic matter, or other objectionable materials.

f. CRUSHED ROCK OR PEA GRAVEL

Coarse granular pipe bedding material shall be a well graded crushed rock or pea gravel which 100% passes a three-eighth inch (3/8") sieve and a maximum of 5% passes a #10 sieve. It shall not contain sod, roots, plants and other organic matter, or other objectionable materials.

g. ROCK STABILIZATION

Rock placed shall meet the requirements of MN/Dot 3137. The rock specified shall conform to the gradation CA-1 in Table 3137-1. Install rock used to stabilize the trench foundation installed at the discretion of the Engineer.

h. LIGHTWEIGHT AGGREGATE

Lightweight aggregate shall consist of aggregate having a density of 48 to 54 pounds per cubic foot installed in the trench bottom at the direction of the Engineer.

i. TREATED TIMBER PILING

Treated timber piling shall conform to MnDOT Specification 3471.

j. GRANULAR MATERIALS

Granular materials furnished for foundation, bedding, encasement, backfill, or other purposes as may be specified shall consist of any natural or synthetic mineral aggregate such as sand, gravel, crushed rock, crushed stone, or slag, that shall be so graded as to meet the gradation requirements specified herein for each particular use by the material manufacturer or as indicated in the Plans, Specifications, or Special Provisions.

k. GRANULAR MATERIAL GRADATION CLASSIFICATION

Granular materials furnished for use in Foundation, Bedding, Encasement, or Backfill construction shall conform to the following requirements:

Foundation materials shall have 100 percent by weight passing the 1-1/2 inch sieve and a maximum of 10 percent by weight passing the No. 4 sieve.

Backfill materials shall consist of existing trench materials, except as otherwise specified in this specification or in the Special Provisions.

Bedding and encasement materials for flexible pipe, where improved pipe foundation is not required, shall meet the requirements of MnDOT Specification 3149.2B.1, Granular Borrow, except that 100 percent by weight shall pass the one-inch sieve.

A gradation report from an approved Independent Testing laboratory of the proposed granular materials shall be furnished to the Engineer before any of the granular materials are delivered to the project.

l. GRANULAR MATERIAL USE DESIGNATION

Granular materials provided for Foundation, Bedding, Encasement, or Backfill use as required by the Plans, Specifications, and Special Provisions, either as part of the pipe item work unit or as a separate contract item, shall be classified as to use in accordance with the following:

Material Use Designation Zone Designation

- i. Granular Foundation --- Placed below the bottom of pipe grade as replacement for unsuitable or unstable soils, to achieve better foundation support.
- ii. Granular Bedding --- Placed below the pipe midpoint, prior to pipe installation, to facilitate proper shaping and to achieve uniform pipe support.
- iii. Granular Encasement --- Placed below an elevation one foot above the top of pipe, after pipe installation, for protection of the pipe and to assure proper filling of voids or thorough consolidation of backfill.
- iv. Granular Backfill --- Placed below the surface base course, if any, as the second stage of backfill, to minimize trench settlement and provide support for surface improvements.

In each case above, unless otherwise indicated, the lower limits of any particular zone shall be the top surface of the next lower course as constructed. The upper limits of each zone are established to define variable needs for material gradation and compaction or void content, taking into consideration the sequence of construction and other conditions. The material use and zone designations described above shall only serve to fulfill the objectives and shall not be construed to restrict the use of any particular material in other zones where the gradation requirements are met.

m. 3" MINUS STABILIZATION AGGREGATE

3-inch minus aggregate material shall meet the gradation as shown in the table below. The material shall consist of crushed limestone aggregate, crushed granite aggregate or recycled concrete but not bituminous asphalt.

Sieve	Percent Passing (%)
3 inch	100
2 inch	90-60
1 inch	80-45
3/4 inch	55-30
#200	3-12

n. PILING

Piling shall be constructed in accordance with the provisions of MnDOT Specification 2452 and special plan details relating to piling.

o. INSULATION

Main Insulation shall be extruded rigid board material having a thermal conductivity of 0.23 BTU/hour/square foot/degree Fahrenheit/per inch thickness, maximum, at 40°F mean, a comprehensive strength of 35 psi minimum, and water absorption of 0.25 percent by volume minimum. Unless otherwise specified in the Plans, specifications, or Special Provisions, board dimensions shall measure 8 feet long, 2 or 4 feet wide, and 1, 1-1/2, 2, or 3 inches thick. See Maple Grove Standard Plate WM-11 for more details.

p. GEOTEXTILE FABRIC

Geotextile fabric shall meet the requirements of MnDOT Specification 3733 and be used as required by the Plans, Specifications, and Special Provisions.

3. SAMPLES, TESTING AND ACCEPTANCE

Compaction testing will be performed for the Owner by an independent testing laboratory (Northern Technologies, Inc.) The cost of passing tests will be paid by the Owner and the Contractor shall pay for all failing test and the retest.

The provisions of MnDOT 1603 and the most current version of the MnDOT Schedule of Materials Control will be the basis for all Quality Control testing performed by the Contractor as part of the Contract Work. In addition, the following testing rates and requirements will be utilized for street and utility construction work as part of Quality Assurance testing by the Owner and shall be performed by Northern Technologies Inc. (NTI). NTI can be contacted at (763) 433-9175

Trench Backfill Density				
Location / Depth	Proctor Type	Min % Compaction	QA Testing Frequency	Reference Specification
Outside Road Core	Standard	95%	1 per 500' of Trench	MnDOT 2105.3
Road Core ≤ below grading grade (bottom of aggregate base)	Standard	100%	1 per 250' of Trench	MnDOT 2105.3
Road Core, > 3' below grading grade	Standard	95%	1 per 500' of Trench	MnDOT 2105.3

Select Granular / Stabilizing Aggregate / Aggregate Base					
Location / Use	Gradation	Test Type	Min % Compaction	QA Compaction Testing Frequency	Reference Specification
Select Granular Borrow	1 per Source	Specified Density	100%	1 per 250' of Roadway	MnDOT 2105.3
Aggregate Base	1/12,000 yd ²	DCP – Penetration Index Method	See Specification	1 per 250' of roadway / trail / sidewalk	MnDOT 2211.3
Full Depth Reclamation	1/12,000 yd ²	DCP for FDR	See Specification	1 per 250' of roadway / trail / sidewalk	MnDOT 2215

4. (2211) AGGREGATE BASE

The provisions of MnDOT 2211 are supplemented and/or modified with the following:

Salvaged crushed concrete aggregate or crushed bituminous/concrete mixture meeting the Class 5 aggregate gradation as per Section 3138 of the current Minnesota Department of Transportation Standard Specification and as approved by the Engineer must be used in lieu of Class 5 aggregate for the street base material.

Add the following at the end of Section 2211.3C, Spreading and Compacting:

In conjunction with the construction, blade-mixing the material shall be required as necessary to produce a substantially uniform gradation and moisture content.

The method of compaction for Aggregate Base, shall be the Quality Compaction Method.

The Contractor shall produce a reclaimed aggregate base by pulverizing the existing bituminous pavement utilizing machine (cold) process to provide a blended aggregate mixture of existing bituminous and aggregate and/or approved granular subgrade material. The pulverizing operation shall produce an aggregate base Class 5 material meeting the provisions of MnDOT Table 3138-4. A Class 5 specifications with maximum bitumen content of 3.5 percent by mass (weight) shall be allowed per Table 3138-2. The pulverizing operation shall be performed to the thickness through the entire depth of bituminous and gravel base. The Contractor will need to make judgment on what that depth should be as field conditions may vary from soil boring reports. The machine speed shall be controlled to produce the required aggregate blend. Excessive oversized particles shall be removed by the Contractor. The line and grade shall be controlled to minimize incorporating undesirable sub grade materials into the reclaim aggregate base. The reclaimed material shall be compacted to provide a temporary driving surface.

"Full Depth Reclamation (various depths)," per square yard (S.Y.) shall include all labor and equipment to pulverize together the existing bituminous and gravel base in a single operation in place. When reclaiming operations are not feasible as determined by the Engineer due to a lack of existing gravel base or other suitable sub grade material, the Contractor shall suspend reclaiming operations and remove and salvage the existing pavement by milling. Whichever method is used, the work shall be measured on the square yard basis and paid for at the bid unit price for reclaimed aggregate base production. All associated work items shall be considered incidental. Contractor shall provide for periodic gradation testing of reclaimed aggregate base material as directed by the Engineer at the sole expense of the Contractor. Removal or reclaiming of bituminous curbing if present, shall be considered incidental to this item

"Reclaim Aggregate Base Class 5 Salvaged and Placed (CV)" per cubic yard (C.Y.) shall include all labor and equipment for excavating, handling, transporting, stockpiling, placing, shaping, necessary compacting operations, and aggregate base placement. All work shall be considered a single operation and incidental.

Excess reclaimed aggregate base not incorporated with the project as indicated in other sections shall become the property of the Contractor

and be disposed of offsite. All excess reclaim material shall be used before importing Class 5 material to the project.

Aggregate base, Class 5, required to be imported to the project shall be recycled aggregate base that meets the Class 5 specification indicated in MnDOT Table 3138-4, or as approved by the Engineer.

Priorities for the use of reclaimed aggregate material shall be determined in the field by the engineer. Typical priorities include:

1. Maintenance of roadway during the project
2. Sewer and water main pipe bedding
3. Trench backfill
4. Subgrade correction
5. Roadway aggregate base
6. Driveway aggregate base

Reclaimed aggregate material shall only be used for driveway aggregate base if it has been strictly verified to meet the Class 5 specification indicated in MnDOT Table 3138-4 gradation.

5. EXCAVATION AND EMBANKMENT

Section 2105 is hereby amended and supplemented to include the following:

All excavation shall be classified as "Common Excavation" unless otherwise stated in the bid proposal.

a. DISPOSITION OF EXCAVATED MATERIAL

Topsoil shall be stripped, stockpiled and used as slope dressing to the minimum depths as shown on the plans and as directed by the Engineer.

The Contractor shall dispose of all excess excavated material at the disposal areas as designated on the plans. The disposal areas shall be kept leveled and suitable for dumping by the Contractor. If no disposal area is indicated on the plans, the excavated material shall become the property of the Contractor and removed from the project limits. Any stockpiling or re-handling of these materials shall be considered incidental to the Contract with no direct compensation therefore.

Excess excavation shall not be deposited on private property without the permission of the Engineer and until a Permission to Fill form has been executed by the property owner. The Contractor shall not be expected to finish grade material dumped on private property as part of this Contract.

b. METHOD OF MEASUREMENT

Common excavation shall be paid for by cross section measure. This item shall include topsoil stripping, as well as excavation required for roadway and walk construction. If designated (P) it shall be paid at plan quantity. Excavation designated (LV) shall be paid for by vehicle measure loose volume. All other excavation shall be assumed excavated volume (EV) based on the cross section measure.

c. EXCAVATION MATERIAL

No payment shall be made for embankment construction behind the curb. Only the excavated material that is cut to line and grade shall be considered for payment. For payment by loose volume (LV) measure, each truck shall be measured by the Engineer and no payment shall be made if the Engineer does not receive a load count each day. All embankments shall be completed before any excess suitable material is disposed of.

All sub-cuts shall be backfilled as indicated on the plans. The backfill shall be placed in accordance with the "Quality Compaction" as specified in MnDOT 2211.

Excavation shall be paid for at the bid price per cubic yard (cross section measure) for sub grade excavation.

All necessary excavation required for the placement of a uniform depth of slope dressing and sod shall be paid for at the unit price per cubic yard of excavation, which includes bank sloping.

During construction, all excavations shall be maintained in such a condition that they will be well drained at all times. Temporary ditches or gutters shall be constructed when necessary to maintain drainage and avoid damage to the roadway. No excavated materials shall be placed or stockpiled in such a manner as to restrict free surface drainage of the sub grade or base courses.

6. PROOF ROLLING

The provisions of MnDOT 2111 are supplemented and/or modified with the following:

Prior to the placement of any geotextile fabric, sub-base material, or aggregate base material, the Engineer will require a proof roll of the existing sub-grade. Proof rolling shall consist of driving a fully loaded dump truck, capable of delivering a minimum 9-ton axle load, over the existing in place sub-grade. This procedure shall be observed by the Project Engineer. The sub-grade shall be considered unstable if any deflection or rutting exceeds set limits defined within the provisions of MnDOT 2111.

All unstable areas shall be corrected and test rolled until the sub-grade meets the requirements or as directed by the Engineer. If there is any measurable precipitation between the original test roll and before any geotextile fabric or aggregate base is placed, if requested by the Engineer, the contractor will be required to re-test roll the sub-grade and make any corrections needed prior to placement of geotextile fabric or aggregate base. All test rolling is considered incidental and no direct compensation shall be made.

Test rolling will be performed no more than 24 hours prior to pavement being placed. If within that time the project receives any measurable precipitation, the contractor will need to conduct another test roll at no extra cost to the Owner, if requested by the Project Engineer. Any additional corrections will need to be corrected and test rolled prior to bituminous being placed.

7. NOTIFICATION TO PROPERTY OWNER

The Contractor shall provide 24 hour notice to the property owner before any driveway is blocked, mailboxes being removed, pavement being placed or any utility work that would disrupt their day to day lives. The contractor shall give the homeowner sufficient time to move their vehicles out of the driveway and park in a location determined by the contractor. No driveway shall be blocked longer than necessary for construction and only as approved by Engineer.

Access to existing businesses shall be maintained at all times. When construction is directly impacting business driveways and entrances, work shall be done continuously and as promptly as possible to return the driveway entrance to a finished surface. The contractor shall exercise care to minimize impacts to business parking facilities.

8. PROTECTION OF UTILITIES

The Contractor is required to protect all Utilities per the General Conditions. Special care shall be taken in crossing of underground gas, electric and telephone conduits.

The Contractor shall cooperate with the private utility company concerned in protecting and supporting conduits for uninterrupted service. The utility company shall be notified immediately of any damage to conduits.

In the event it is necessary to cut any gas line to perform the necessary grading, such cutting shall be performed by the utility company, at no expense to the Contractor. Any accidental breakage of gas lines shall be the responsibility of the Contractor; such breakage shall be repaired by the utility company. The Contractor shall contact the utility company prior to excavating in any street.

9. PROTECTION OF EXISTING DRIVEWAYS, CURBS AND SIDEWALKS

Any concrete, blacktop, crushed rock, or other type of driveway material carelessly disturbed by the Contractor during construction shall be replaced or rebuilt to a condition at least equal to its condition at time of removal. There shall be no compensation allowed for this item.

Existing concrete curb or sidewalk not scheduled for removal and replacement that is carelessly damaged by the Contractor during any construction activities will be replaced at no cost to the City.

10. PROTECTION OF IRRIGATION AND PET CONTAINMENT SYSTEMS

Care must be taken to ensure that existing irrigation and underground pet containment systems in place at start of construction are protected from unnecessary damage. The Contractor shall provide irrigation and pet containment system repairs to systems that were damaged during normal construction operations.

This work includes removing existing pipe, irrigation heads, valves, tees, valve boxes, pet containment wiring, conduit, blowing out the system prior to winter freeze up, verifying the system functions the following spring if repairs occurred late in the construction season, etc. related to these systems and reinstalling salvaged items or installing new items such that the system is returned to its pre-construction condition. All wiring and piping shall be made water tight with industry approved materials. Irrigation heads shall match the style of the existing systems unless otherwise approved by the Engineer.

The Contractor shall verify all irrigation head and line locations prior to construction operations so as to protect the portions of the systems that will not be affected by construction. Unnecessary damage caused to the existing system inside or outside the construction limits shall be repaired at the Contractor's expense.

Damage occurring to systems as approved by the Engineer during normal construction activities shall be paid at the contract unit price for irrigation system repair and pet containment system repair and shall include all labor, equipment, and materials associated with these repairs.

11. CLEANING OF CATCH BASINS, MANHOLES AND GATE VALVES

The Contractor shall prevent dirt, concrete, or any other material from entering existing manholes, catch basins, or water valve boxes. All removal of such material from the sewers or repairs caused by such negligence shall be made at the expense of the Contractor.

12. DUST CONTROL

The Contractor shall be required to adequately control dust on the streets at all times. When directed by the Engineer, the Contractor shall provide one tank truck, adequate size, with spray bar or other suitable equipment for sprinkling streets, which shall be available at all times for dust control. It shall be the specific requirement that dust control measures are strictly adhered to and a regular watering schedule be implemented when directed by the Engineer (e.g. once in the morning, once mid-day and once late afternoon). The Owner shall furnish the water free of cost, but reserves the right to indicate the source of supply. The Contractor shall acquire one water meter per project from the Owner for use by the Contractor and all sub-contractors at a cost of \$1200. A pay item shall be designated for this item.

Saw cut operations shall utilize wet sawing techniques or approved equal to reduce the amount of dust created by sawing operations of both concrete and bituminous pavements.

The Contractor shall be required to respond to any verbal notice from the Engineer regarding dust control and respond appropriately within one (1) hour from the time of notification. If the Contractor fails to take appropriate action as indicated, the Engineer shall have corrections made and assess \$500.00 damage plus costs incurred in correcting the violation. Damages shall be assessed for each violation or repeat violation and appropriate deductions shall be made to the final Contract payment.

13. TURF ESTABLISHMENT

The contractor shall be responsible to distribute the "Caring for your new sod fact sheet – 2105" to all existing homes within the project during the installation of the sod or immediately upon completion of the sodding. This letter can be found as Exhibit J in the Conditions of the Contract page 67 or ask the City of Maple Grove for a copy.

a. SOD AND SEED

Unless specifically indicated in the Contract, the sod and seed provided for this project and the procedure for sodding shall conform to the requirements of MnDOT Specifications 2575, 3876, 3877 and 3878 and as modified herein:

Sod shall be level and blend into the existing sod smoothly. Where sod is blended into existing sod, this edge shall be cut with a sod cutter to a depth equal to the thickness of the new sod.

Determination of seed application during MnDOT blackout dates from June 1 to July 20 and after September 20 shall be as directed by the Engineer. This shall include watering and other maintenance items. Rural seed mixture 250 and Urban seed mixture 260

All sod and seed areas shall be maintained for a period of 30 growing days from the date of installation. Maintenance includes watering, weeding, fertilizing and mowing to establish turf and create an adequate root system on the sod and seeded areas. The Engineer will then make the final inspection and consider acceptance of the sod and seed.

Apply fertilizer, analysis 12-0-12, to all sod and seed areas at the rate of 200 lbs. /acre.

For seeded areas, bare spots which persist after three weeks of favorable growing weather shall be re-cultivated and re-seeded as many times as necessary until acceptable turf is established. Acceptable turf shall contain no erosion washes, no bare spots greater than 0.5 square foot, no bare areas comprising more than 0.5% of any given 1,000 square foot area, and no deformation of turf areas caused by mowing or other Contractor equipment.

b. LANDSCAPING

Landscaping shall be done in locations designated on the plans or at other locations as directed by the Engineer. The work shall include

the replacement of all sod which has been disturbed or uprooted by other phases of the Contract.

C. HYDRO-SEEDING

Hydro-seeding application shall be completed from two different directions to ensure even application and reduce shadow areas. The Contractor shall protect existing driveways, curb and gutter, landscaping, plantings, walls, and all other in place items from hydro-seed overspray. Any overspray shall be removed by the Contractor within 24-hrs of receiving notice from the Engineer.

d. WATERING

Water use permits must be obtained from the Utility Department at 9030 Forestview Lane prior to using water. Draw water from hydrant designated by the Utility Department on that particular project only. Watering equipment shall be inspected by Utility Department personnel prior to issuing a permit. The permit will be issued at no cost to the Contractor. The Contractor shall provide all the labor and equipment for the application of water in turf restoration areas for the duration of the maintenance period. If no pay item is designated for watering for turf establishment then this shall be considered incidental.

Watering shall be required throughout the growing period/maintenance including the period from June 1 to July 20. A growing day is any calendar day between April 15 to November 1. If the maintenance period does not conclude by Nov. 1, the remaining balance on the warranty will carry over to begin on April 15 of the following year.

e. TOPSOIL

The contractor is responsible for removing 6" of material in all areas needing topsoil to accommodate placement of the new topsoil that meets 3877.2.D. Onsite material will only be allowed if it meets the requirements of 3877.2.D and must be tested prior to placement in the field.

Topsoil shall be pulverized and free of heavy clay, peat, stones, plants, roots, sticks and other foreign materials. The topsoil borrow material shall be a light and friable loam, be black in color appearance and meet the requirements in accordance with MnDOT Specification 3877.2.D. but shall have a minimum 6% organic

content. The topsoil shall be tilled by disking, rototilling, or other approved method of tillage to a minimum average depth of 3.0 inches, and shall be leveled and raked to prepare a smooth and even seedbed with a loose and open surface. Stones and other debris over 1.5 inches in diameter shall be removed from the soil surface. A uniform grade shall be established so that no depressions or elevations are present, and so that the safe and effective operation of mowing equipment shall not be hindered after the turf grass is established.

Contractor shall furnish test results and samples prior to delivery of the material to the project.

Prior to placing any topsoil the slopes shall be cut uniformly such that the finished sodded slope shall conform to the designated section. Topsoil shall be placed to a minimum depth of 6" for both seeding and sodding operations. The topsoil shall be raked and all lumps and irregularities removed prior to placing the sod or seed. Operations to remove lumps or irregularities shall be incidental to topsoil placement. The topsoil shall not be too loose whereby footprints greater than 1.0 inches are observed, nor shall it be too dense whereby only footprints less than one-eighths of an inch are observed.

Care shall be taken to insure that the topsoil does not contaminate the subgrade or base of the roadway. Grading stakes, stones, trash, root masses, and other debris which may hinder the distribution of fertilizer, compost, seed, or seed mulch during seeding operations shall be removed from the site when seedbed preparation operations are completed. Soil, fertilizer, compost and seed shall be removed from paved areas as soon as possible after seedbed tilling, grading, and seeding operations are completed.

It shall be the responsibility of the contractor to ensure that the soil of the seedbed preparation area is not blown or washed from the site and that nearby areas are protected from soil, fertilizer, compost, etc. In the event of heavy rain or wind that causes damage to the site which may have been anticipated and prevented by the contractor, then the contractor shall repair the damaged areas so they are restored to a condition acceptable under the specifications; when soil or other material is moved from the site and deposited on nearby areas the contractor shall restore those areas to a condition substantially similar to that which prevailed before the damaging event. Watering of seeded areas shall be done with

equipment necessary to prevent seed from being displaced from its original location.

Do not place topsoil until the Engineer has inspected the area and approved the subgrade preparation and topsoil materials.

Do not complete topsoil fine grading more than 24 hours prior to the sod laying operation. Remove topsoil placed on unapproved areas or topsoil which does not meet Mn/DOT Spec. No. 3877.2.D with removal being done at the Contractor's expense.

f. APPLICATION RATES

Seed Mixture 25-151: 300 lbs/AC

Fertilizer Type 3 (22-5-10): 450 lbs/AC

Hydraulic Soil Stabilizer Type Fiber Reinforced Matrix (FRM) Flexterra HP-FGM by Profile Products LLC or approved equal as approved by the Engineer: 2,500 lbs/AC (100% Coverage)

g. STREET SWEEPING

Sweep the streets following the completion of the sodding and seeding operations. Complete sweeping within seven (7) calendar days after completion of the sodding and seeding operation. This sweeping shall be with a pick-up power sweeper and continue until loose material is cleaned up to the satisfaction of the City Engineer. Also clean catch basins to the Engineer's satisfaction within the same time requirements stated above.

14. TREE REMOVAL

The trees encountered shall be cleared and grubbed as directed by the Owner and disposed of outside of the City of Maple Grove City limits.

Where trees are not marked for removal, the Contractor shall protect these trees in accordance with MnDOT Spec. 2572. The Contractor shall take special care to preserve existing trees and shrubs wherever possible. This may include careful grading operations, slight adjustments of slopes, and placing silt fence at tree drip lines. Protection of trees not identified to be removed shall be incidental.

Current and pertinent government regulations concerning disposal of elm trees or other types of trees shall be adhered to.

Cleared trees may be claimed by the abutting property owner, and if so, they shall be trimmed, cut into sixteen inch (16") lengths and piled on private property. All other material shall be disposed of by the contractor.

15. CLEAN ROOT CUTTING

Where trees are not marked for removal, but root systems interfere with the construction of curb and gutter or sump drain, Contractor shall clean cut the roots in accordance with MnDOT Spec 2572.3A.2.

16. LANDSCAPE ROCK

This work shall include all work necessary to furnish and install the landscape rock. The type and size of landscaping rock shall be of similar size, shape and color of the existing landscaping rock. The work shall include, but not be limited to, all equipment, labor, fabric barrier between the sub grade soil and the landscape rock, backfilling, landscape edging and other materials necessary to complete the work. The work shall be coordinated with the Engineer and property owners prior to removal and installation.

17. MAIL BOXES

The Contractor shall relocate mailboxes as necessary. Mail boxes shall be set 41" to 45" up from top of curb to the bottom of box and front of mail box shall be 6" to 8" from back of curb. Mailbox relocations (both temporary and permanent) shall be accomplished so there will be no interruption of mail service. This work shall be considered incidental and no direct compensation shall be provided unless a specific bid item is included in the Contract for such work.

18. TRAFFIC SIGNS AND DEVICES

Traffic Signs and Devices shall be constructed in accordance with MnDOT 2564, except as follows:

a. MATERIALS

i. Sign Panels:

Provide in accordance with the latest MnDOT Standard Signs Manual, the Minnesota Traffic Engineering Manual, the MMUTCD, the plans, MnDOT 2564, and as follows.

All Traffic signs will be Type C DG-3 Diamond Grade.

Fabricate in accordance with the following

- a. Sign base material: Sheet aluminum conforming to material requirements of MnDOT 3352.2A.1a.
- b. Sign face material: Reflective sheeting conforming to MnDOT 3352.2A.2.a.
- c. Sign legend material: "Direct Applied" conforming to the requirements of MnDOT 3352.2A.5.c or 3352.2A.5.d.

ii. Traffic sign posts:

Provide 3.0 pounds/foot flanged channel Ribbed Back Galvanized sign posts conforming to MnDOT 3401.

Provide quantity of Galvanized sign posts at each installation in accordance with the Plans.

Provide sign structural components for mounting sign panels (including posts, knee braces, etc.) in accordance with the applicable provisions of the Plans, the Minnesota Traffic Engineering Manual and with the details enclosed in these Special Provisions/the Plans

Determine length of Galvanized sign posts in accordance with the following sign panel mounting height guidelines provided in these Specification. All Galvanized sign posts must be installed 4 feet below finished grade.

Where Type C Signs are to be installed on street name sign posts, permanent barricades, or on traffic signal poles, mounting hardware required to mount sign panels shall be approved by Engineer prior to installation.

iii. Fabrication Stickers

Screen a fabrication sticker and affix to backside of each new Type C sign panel in lower right-hand corner (when facing the back of the sign.)

Provide full size mock-up (minimum 1-1/2 inches by 3 inches) of sticker to Engineer for written approval prior to producing any stickers for the Project.

Produce fabrication sticker in accordance with the following:

Colors shall be black legend on white reflectorized background.

Month and year of fabrication of the sign panel shall be punched out prior to installation of sticker on sign panel.

Fabrication sticker shall be similar to example shown below, unless otherwise approved by the Engineer.

Sign Company Name

Address

Month 1 2 3 4 5 6 7 8 9 10 11 12

Year 14 15 16 17 18

iv. Street Name Signs:

The Owner will provide street name signs for the Contractor to pick up from Public works. Contractor must coordinate work with Engineer on site and give a minimum of a 72 hour notice before picking up.

Contractor will need to supply the 2 3/8" outside diameter galvanized steel post for all street name signs and all other materials need for installation. This includes but not limited to nuts, bolts, installing steel plate, rivet and all labor.

v. Post:

Provide round galvanized steel pipe as follows:

2-3/8-inch outside diameter

12 gauge minimum diameter

Tubular post to have hole drilled or blown through 8" from bottom for insertion of pin. Pin to be 10" x 1/2" or greater diameter rebar or similar material. Pin through post to prevent rotation of post in the event of cracked or failed footing.

vi. Mounting Hardware:

Provide steel assembly units as follows:

Post cap with 5/16-inch bolts and 3/16" Aluminum rivets and 1/4" Stainless Steel rivets to secure.

When only one street name is to be installed the Contractor will need to use a Lyle E-250 bracket. When there are 2 or more street signs, the Contractor must use a Lyle E-450 bracket for installation.

Bracket assembly shall be Lyle E-450 for post mounted assemblies, Lyle E-450 OLP for street light pole mounted assemblies, or Engineer approved equal. Street light pole assemblies shall be mounted using stainless steel straps.

All remounting hardware shall be galvanized or aluminum.

[END OF GRADING, LANDSCAPING & TRAFFIC CONTROL]



Minnesota Concrete Flatwork Specifications



MINNESOTA LTAP UNIVERSITY OF MINNESOTA

March 2014

Prepared by:

David P. Frentress, P.E.
Frentress Enterprises, LLC
56800 194th Street
Park Rapids, Minnesota 56470

Jim Grothaus, Principal Investigator
Center for Transportation Studies
University of Minnesota



Table of Contents

Version 3 – March 19, 2014

PART 1.	GENERAL	1
1.1	Concrete Street Items	1
1.2	Description of Work.....	1
1.3	Storage and Handling	1
1.4	Definitions	1
1.5	Measurement and Payment	1
PART 2.	PRODUCTS.....	3
2.1	Materials	3
2.2	Concrete Mixes	8
PART 3.	EXECUTION.....	9
3.1	Personnel.....	9
3.2	Pre-Pour Meeting.....	9
3.3	Mixing Equipment	10
3.4	Concrete Placement Equipment.....	11
3.5	Concrete Pavement Construction	14
3.6	Curb and Gutter Construction	23
3.7	Sidewalk Construction.....	24
3.8	Curing of All Concrete	24
3.9	Concrete Protection	25
3.10	Opening Concrete to Traffic.....	26
3.11	Contractor Submittal Requirements.....	27
3.12	Concrete Sampling and Testing Requirements.....	28
PART 4.	CONCRETE STRENGTH BY THE MATURITY METHOD	38
4.1	Concrete Strength by the Maturity Method	38
PART 5.	PRE-POUR MEETING.....	40
5.1	Pre-Pour Meeting for Concrete Pours > 500 cubic yards	40

List of Tables

Table 1: Fine Aggregate ASR Mitigation Requirements for Concrete Pavements	4
Table 2: Concrete Fine Aggregate Gradation	5
Table 3: Coarse Aggregate for General Use	5
Table 4: Enhanced Coarse Aggregate Quality Specification	6
Table 5: Minimum Testing Rates for Curb and Gutter, Sidewalk and Pavement.....	29
Table 6: Air Content Penalties Target of 6.5% with a Range of 5% – 8.5%	30
Table 7: Concrete Pavements Only.....	32
Table 8: Deductions for Concrete Pavement Thickness Deficiencies	36
Table 9: Evaluation of Core Test Results	37
Table 10: Deductions for Low-Strength Test Results	38

PART 1. GENERAL

1.1 Concrete Street Items

- A. Concrete Pavement
- B. Curb and Gutter and Driveways and Aprons
- C. Concrete Sidewalks and Median Pavement

1.2 Description of Work

This specification includes the requirements for the construction of concrete flatwork including pavements, curb and gutter, sidewalks, driveways, and aprons.

1.3 Storage and Handling

Follow these *Minnesota Concrete Flatwork Specifications* and any local covenants, as well as the following:

- A. Aggregate Storage: Store aggregates so that segregation and inclusion of foreign materials are prevented. Do not use the bottom 12 inches of aggregate piles in contact with the ground.
- B. Cementitious Materials: Store cement, slag cement, and fly ash in suitable moisture-proof enclosures. Do not use cementitious materials that have become caked or lumpy.
- C. Admixtures: Store in suitable weather-tight enclosures that will preserve quality.
- D. Reinforcing Steel: Store off ground on timbers or other supports.

1.4 Definitions

- A. Engineer, or owner's representative, is defined as the individual, firm, or corporation delegated with the responsibility for the Engineering supervision of the construction.
- B. Contractor is defined as the individual, firm, or corporation contracting for and undertaking execution of the prescribed work.

1.5 Measurement and Payment

- A. Concrete Pavement
 - 1. Measurement: Measurement will be in square yards for each different thickness of concrete pavement. The area of manholes, intakes, or other fixtures in the pavement will not be deducted from the measured pavement area. When the curb is integral with the pavement, the width for pavement square yards will be measured from back of curb to back of curb.

2. Payment: Payment will be at the unit price per square yard for each thickness of concrete pavement in accordance with typical sections and details in the plan sheets.

B. Curb and Gutter

1. Measurement: Measurement will be in linear feet measured along the face of the curb for each different width and thickness of curb and gutter. If integral curb is used, the curb measurement will be in linear feet measured along the face of the curb.
2. Payment: Payment will be at the unit price per linear feet of curb and gutter.

C. Driveway Pavement Entrances

1. Measurement: Measurement will be in square yards of concrete area including apron and sidewalk areas through the driveway.
2. Payment: Payment will be at the square yard price for each thickness of driveway: residential (6 inches) and commercial (8 inches).

D. Sidewalk and Concrete Median

1. Measurement: Measurement will be in square yards of concrete area.
2. Payment: Payment will be at the unit price per square yard of concrete area.

E. Concrete Testing for the Engineer's Representative - Table 5

1. Measurement: Lump sum item; no measurement will be made. Minimum testing requirements will be as defined for the Engineer's Representative in Table 5 of this specification.
2. Payment: Payment will be at the lump sum price for concrete street items under the Concrete Sampling and Testing rates as required by Table 5 of this specification.

F. Concrete Pavement Smoothness Testing for Areas of Localized Roughness (ALR)

1. Measurement: Lump sum item; no measurement will be made. Testing rate will be determined by the number of lanes of concrete pavement placed on the project.
2. Payment: Payment will be at the lump sum price for "Concrete Pavement Smoothness Testing for Areas of Localized Roughness (ALR)" within this specification.
3. Includes: Lump sum price includes the use of a MnDOT-certified profiler and MnDOT-certified operator to test the smoothness and submit all reports showing the ALR. It will also include a second run after any correction work is done if needed to verify that the ALR specification is met.

G. Maturity Testing for Compressive Strength

1. Measurement: Lump sum price includes, but is not limited to, maturity curve establishment and five locations on the project.
2. Payment: Payment will be at the lump sum price for concrete maturity for each mix tested.
3. Includes: All the testing and necessary equipment to complete the maturity determination for five different locations on a project.

H. Enhanced Coarse Aggregate Quality – Table 4

1. Measurement: Lump sum price includes providing coarse aggregate meeting the requirements of Table 4, “Enhanced Coarse Aggregate Quality.”
2. Payment: Payment will be included in the price for the concrete item: curb and gutter, sidewalks, or concrete pavement.
3. Includes: All the testing to ensure that the aggregate quality passes the requirements of Table 4 as defined in Table 5.

PART 2. PRODUCTS

2.1 Materials

- A. Cement: Cement shall be from MnDOT-certified sources only and be listed on the MnDOT approved products list and follow MnDOT 3101.
- B. Supplementary Cementitious Materials (SCM)
 1. Fly ash: Fly ash shall be from certified sources only and be listed on the MnDOT-approved list under MnDOT 3103.
 2. Slag cement (ground granulated blast furnace slag or GGBFS): Slag cement shall be from certified sources only and be listed on the MnDOT-approved list under MnDOT 3102.
- C. Fine Aggregate for Concrete
 1. Fine aggregate gradation shall comply with ASTM C33 or MnDOT 3126. The quality requirements shall comply with MnDOT 3126.
 2. The fine aggregate shall be washed.
 3. The quantity of deleterious substances, as determined by mass (weight), shall not exceed the following limits:
 - a. Coal and lignite: 0.3%.
 - b. Other deleterious substances such as shale, alkali, mica, soft and flaky particles, cumulative total: 2.5%.

4. Mitigation for fine aggregates:

- a. For any fine aggregate used in curb and gutter, sidewalks, or driveway entrances: the maximum allowable expansion at 14 days is 0.300.
- b. For any fine aggregate used in concrete pavement, the maximum allowable expansion at 14 days is defined in Table 1 below.

If the fine aggregate has been previously tested by MnDOT, use the highest expansion result of any of the tested fine aggregate and cement combinations to determine necessary mitigation in accordance with the 14-day fine aggregate expansion limits in Table 1 for concrete pavements. The Contractor may contact MnDOT to access the list of previously tested fine aggregate sources or review the MnDOT Concrete Engineering website for the latest test results.

If the fine aggregate has not been previously tested by MnDOT, the fine aggregate shall be tested by an independent testing laboratory in accordance with ASTM 1260, to determine the necessary mitigation based on the proposed fine aggregate and cement combination in accordance with the 14-day fine aggregate expansion limits in Table 1.

Table 1 Fine Aggregate ASR Mitigation Requirements for Concrete Pavements	
14-day Fine Aggregate Expansion Limits	
≤ 0.150	Use of the fine aggregate is acceptable with or without a mitigator
> 0.150 – 0.250	Mitigate the fine aggregate with 35 percent ground-granulated blast furnace slag or at least 20 percent fly ash
> 0.250 – 0.300	Mitigate the fine aggregate with 35 percent ground-granulated blast furnace slag or 30 percent fly ash in accordance with 3115, modified with at least 66.0 percent $\text{SiO}_2 + \text{Fe}_2\text{O}_3 + \text{Al}_2\text{O}_3$ on a dry weight basis and at least 38.0 percent SiO_2
> 0.300	The fine aggregate will not be acceptable for use in concrete pavement

5. The fine aggregate shall comply with MnDOT 3126 gradation requirements as shown in Table 2, unless otherwise reviewed by the Engineer. The fineness modulus of the delivered fine aggregate shall not deviate by more than 0.20 from the submitted gradation, unless otherwise reviewed by the Engineer.

Table 2 Concrete Fine Aggregate Gradation	
Sieve Size	Percent Passing
3/8"	100
#4	95-100
#8	80-100
#16	55-85
#30	30-60
#50	5-30
#100	0-10
#200	0-2.5

D. Coarse Aggregate for Concrete

1. Coarse aggregate shall be crushed rock, washed gravel, or other inert granular material meeting ASTM C33 Class 4S Quality requirements or MN/DOT 3137 except as modified in Table 3 or Table 4.*
2. Coarse aggregate gradation shall comply with ASTM C33, Size 67 or MnDOT 3137 requirements for the individual classification.

Table 3 Coarse Aggregate for General Use		
Quality Test		Maximum Percent by Weight
(a)	Shale:	
	Fraction retained on the ½-inch sieve	0.4
	Fraction retained on the No. 4 sieve, as a percentage of the total material	0.7
(b)	Soft iron oxide particles (paint rock and ochre)	0.3
(c)	Total spall materials*:	
	Fraction retained on the ½-inch sieve	1.0
	Fraction retained on the No. 4 sieve, as a percentage of the total material	1.5
(d)	Soft particles"	2.5
(e)	Clay balls and lumps	0.3
(f)	Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps†	3.5
(g)	Slate	3.0
(h)	Flat or elongated pieces‡	15.0
(i)	Quantity of material passing No. 200 sieve:	
	Class A and Class B aggregates#	1.5
	Class C and Class D aggregates§	1.0
(j)	Los Angeles Rattler, loss on total sample	40.0
(k)	Soundness of magnesium sulfate**	15.0

Table 3 (continued)

*	Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.
"	Exclusive of shale, soft iron oxide particles, and total spall materials.
†	Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 sieve.
‡	Thickness less than 25 percent of the maximum width. Length greater than three times the maximum width.
#	Each individual fraction at the point of placement consists of dust from the fracture and is free of clay or shale.
§	For each individual fraction at the point of placement.
**	Loss at five cycles for any fraction of the coarse aggregate. Do not blend materials from multiple sources to obtain a fraction meeting the sulfate soundness requirement.

3. Provide Coarse Aggregate in accordance with Table 4 instead of Table 3 when the Contract includes a bid item for Enhanced Coarse Aggregate Quality.

Table 4 Enhanced Coarse Aggregate Quality Specification

Quality Test		Maximum Percent by Weight
(a)	Shale:	
	Fraction retained on the ½-inch sieve	0.2
	Fraction retained on the No. 4 sieve, as a percentage of the total material	0.3
(b)	Soft iron oxide particles (paint rock and ochre)	0.2
(c)	Total spall materials*:	
	Fraction retained on the ½-inch sieve	1.0
	Fraction retained on the No. 4 sieve, as a percentage of the total material	0.5
(d)	Soft particles"	2.5
(e)	Clay balls and lumps	0.3
(f)	Sum of (c) total spall materials, (d) soft particles, and (e) clay balls and lumps†	2.5
(g)	Slate	3.0
(h)	Flat or elongated pieces‡	15.0
(i)	Quantity of material passing No. 200 sieve:	
	Class A and Class B aggregates#	1.5
	Class C and Class D aggregates§	1.0
(j)	Los Angeles Rattler, loss on total sample	40.0
(k)	Soundness of magnesium sulfate**	15.0
(l)	Absorption for Class B aggregate	1.75
(m)	Carbonate in Class C and Class D aggregates by weight	30.0

Table 4 (continued)

*	Includes the percentages retained by shale and soft iron oxide particles, plus other iron oxide particles, unsound cherts, pyrite, and other materials with similar characteristics.
"	Exclusive of shale, soft iron oxide particles, and total spall materials.
†	Sum of the total spall materials, soft particles, and clay balls and lumps. For total spall materials, use the percent in the total sample retained on the No. 4 sieve.
‡	Thickness less than 25 percent of the maximum width. Length greater than three times the maximum width.
#	Each individual fraction at the point of placement consists of dust from the fracture and is free of clay or shale.
§	For each individual fraction at the point of placement.
**	Loss at five cycles for any fraction of the coarse aggregate. Do not blend materials from multiple sources to obtain a fraction meeting the sulfate soundness requirement.

- D. Water Requirements: Mixing water used in the production of concrete shall meet ASTM C1602 / C1602M or MnDOT 3906.
- E. Admixtures: Unless otherwise acceptable to the Engineer, all admixtures shall be from one manufacturer and shall be compatible. Only use admixtures found on the MnDOT-approved/qualified list according to MnDOT 3113.
- F. Reinforcement Bars and Dowel Bars: Comply with the requirements of ACI 301, Section 3.2 (provide Grade 60 reinforcing and dowel bars unless noted otherwise) or according to MnDOT 3301 and 3302.
- G. Joint Fillers and Sealers
1. Preformed isolation/expansion joint fillers and sealers: Comply with ASTM D1751, preformed, resilient, non-extruding, asphalt impregnated joint filler, ½-inch thick unless otherwise indicated. Joint filler shall be a single piece the full depth thickness of the concrete.
 2. Hot-pour joint sealer: Comply with MnDOT 3725.
- H. Liquid Membrane Curing Compound: Comply with MnDOT 3754 AMS.
- I. Curing Covering Materials
1. Plastic film: Comply with ASTM C171.
 2. Insulating blanket: Provide waterproof insulating blankets with a minimum R-value of 1 or greater.

2.2 Concrete Mixes

A. Mix Design

1. Prepare design mixes for each type and strength of concrete in accordance with ACI 301 by the field experience method or, if available, by laboratory trial batch methods. Mix proportions shall produce consistent and workable concrete that can be readily worked into forms and around reinforcement without segregation or excessive bleeding.
 - a. Field experience method: If field test data is available, in accordance with ACI 301, submit for acceptance the mixture proportions along with the field test data.
 - b. Trial batch method: Use an AMRL-accredited laboratory for preparing and reporting proposed mix designs.
2. Ensure compatibility of all material combinations. If the concrete materials are not producing a workable concrete mixture, a change in the material may be required. Changes will be at no additional cost to the Engineer.
3. Proportion normal mixtures to provide concrete with the following properties:
 - a. Minimum compressive strength (28 days): 4000 psi.
 - b. Minimum cement content: 400 pounds.
 - c. Minimum cementitious content: 530 pounds.
 - d. Maximum cementitious content: 658 pounds.
 - e. Maximum water-cementitious materials ratio at point of placement:
 1. For machine placement: 0.42
 2. For hand placement: 0.45
 - f. Slump limit: As needed for proper placement; 5-inch maximum. No minimum as long as proper consolidation is being performed.
 - g. Early-strength concrete mixes shall be designed to reach opening compressive strength of 3000 psi at a predetermined time (i.e., 48 hours, 24 hours, etc.).
4. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content of 6.5 percent plus 2.0 percent or minus 1.5 percent.
5. If using calcium chloride, limit the water-soluble, chloride-ion content in hardened concrete to 0.08 percent by weight of cementitious materials.

6. Chemical admixtures: Use admixtures according to manufacturer's written instructions. Contractors may use the following approved admixtures at their discretion as listed on the MnDOT-approved products list:
 - a. Type A, water-reducing and mid-range water-reducing admixtures
 - b. Type B, retarding/hydration stabilizer admixtures
 - c. Type C, accelerating admixtures
 - d. Type D, water-reducing and retarding admixtures
 - e. Type S, viscosity-modifying admixtures
 - f. Admixtures containing more than 0.15 percent chloride ions, by weight of admixture, are not permitted.
7. Supplementary cementitious materials: The Engineer will not allow ternary mixes (combination of three or more cementitious materials) . Limit percentage by weight of supplementary cementitious materials according to ACI 301 requirements for concrete exposed to deicing chemicals as follows:
 - a. Fly ash: 30 percent maximum for concrete pavement, 25 percent maximum for everything else , OR
 - b. Slag cement: 35 percent maximum.

PART 3. EXECUTION

3.1 Personnel

- A. The Concrete Contractor, or Subcontractor, shall have at least two people with a current ACI concrete flatwork technician or flatwork finisher certification, and at least one of them must be onsite for all concrete pours.
- B. Use either MnDOT- or ACI-certified personnel to perform all process control and quality control testing.

3.2 Pre-Pour Meeting

- A. When the concrete quantities for the project are greater than 500 cubic yards, the Engineer will require a pre-pour meeting before the concrete project begins. If the project is constructed over multiple years, the Engineer will require a pre-pour meeting annually. An example checklist of discussion items is given in Section 5.1 of this specification.

3.3 Mixing Equipment

A. Batching and Mixing Equipment

1. General

- a. Weighing and proportioning equipment: Comply with ASTM C94.
- b. Mixing equipment: Comply with ASTM C94.
- c. Material bins: Involves any structure in which materials are stored. Each part of any bin, including foundations and supports, must be adequate to withstand any stress while in use.

2. Batching

- a. Batching plants shall be NRMCA- or MnDOT-certified with a current MnDOT Concrete Plant Contact Report, Form 2163. Provide copy of current calibrations and approvals.
- b. Coordinate the batch plant operation with the placement operation in order to ensure a steady supply of concrete.
- c. Operate the batch plant and trucks to minimize dust, noise, or truck nuisances as part of the quality control plan.

3. Mixing (Ready-mixed Concrete)

- a. Ensure the concrete is uniform in composition and consistency. If non-uniform, concrete producers must take corrective action.
- b. Ready-mixed concrete is defined as concrete proportioned in a central plant and mixed in a stationary mixer for transportation in trucks without agitation; proportioned at a central plant, and only partially mixed in a stationary mixer for transportation and finish mixing in a transit mixer; or proportioned at a central plant and then mixed in a transit mixer prior to or during transit.
- c. When necessary to add additional mixing water at the site of placement, mix the batch at least an additional 50 revolutions of the drum at mixing speed or five minutes, whichever is faster.
- d. All methods: Deliver each truck load of concrete with a computerized certificate of compliance showing plant name, Contractor, project data, batch quantities and total yardage, w/cm, mix designation, time batched, and water available to add on-site. Give a record of the certificates of compliances for each pour to the Engineer.
- e. Ensure the methods of delivering and handling the concrete are such that objectionable segregation or damage to the concrete will not occur, and concrete placement will occur with a minimum of re-handling.

- f. Thoroughly clean the truck compartment in which concrete is transported, and flush with water to ensure that hardened concrete will not accumulate. Discharge the flushing water from the truck compartment to the designated discharge point before it is charged with the next batch.
 - g. Delivery requirements: Place concrete into the work in accordance with the following:
 - i. Type 1 concrete: within 90 minutes of batching, and
 - ii. Type 3 concrete: within 90 minutes of batching when all admixtures are added at the plant at the manufacturer's recommended dosage rates listed on the Approved Products list.
 - iii. In any case, do not add additional mixing water once the concrete is 60 minutes old.
 - iv. Mix the load a minimum of five minutes or 50 revolutions at mixing speed after addition of any admixture.
 - v. The Contractor may transport Type 3 concrete in non-agitating equipment if the concrete is discharged within 45 minutes of batching.
 - vi. Batch time starts when the batch plant or the transit mix truck adds the cement to the other batch materials.
- B. Concrete Washout Guidance
- 1. These specifications will be governed by the Minnesota Pollution Control Agency's written guidance in February 2009. This document, which details the NPDES/SDS construction stormwater permit requirements, is titled "wq-strm2-24'February 2009."

3.4 Concrete Placement Equipment

A. Slipform Construction Equipment

A.1 Curb and Gutter Construction

- 1. Place concrete curb and gutter using a slipform machine capable of placing and forming the concrete to the dimensions, quality, workmanship and appearance as required by the Contract. Hand finish the surface and texture as required by the Contract.

A.2 Concrete Pavement Construction

- 1. Place concrete pavement using a slipform paver or combination of pavers designed to spread, consolidate, screed, and float-finish the freshly placed concrete with minimum hand-finishing. Provide a slipform paver with a non-oscillating extrusion plate with an adjustable angle of entry.

2. Place the concrete pavement before placing curb and gutter when possible. If the sequence of operations includes placing the curb and gutter before the concrete pavement, submit a jointing plan to the Engineer for approval before placing the curb and gutter.
3. If no jointing plan is shown in the plans, the Contractor will provide a jointing plan to be approved by the Engineer.
4. Consolidate the full width and depth of concrete pavement placed by a single pass of a series of internal vibrators. Operate full-width vibrators from 3,600 VPM to 7,000 VPM (60 Hz to 117 Hz) in concrete, and from 4,150 VPM to 8,000 VPM (70 Hz to 133 Hz) when checked in air. Deliver the vibrator impulses directly to the concrete and operate at an intensity to consolidate the concrete uniformly throughout the entire depth and width of the concrete. The Contractor may increase the vibrator frequency as approved by the Engineer. Perform additional testing as directed by the Engineer at no additional cost to the Engineer. If the vibrator fails, suspend operations and remove unconsolidated concrete.
5. Provide an electronic monitoring device meeting the following characteristics and requirements to display the operating frequency of each individual internal vibrator for concrete pavement placed by the slipform method:
 - ⌘ Contains a readout display near the operator's controls; visible to the paver operator and to the Engineer,
 - ⌘ Operates continuously as the paving machine operates,
 - ⌘ Displays all the vibrator frequencies with manual and automatic sequencing for each of the individual vibrators, and
 - ⌘ Records the following at least every 25 feet [7.62 m] of paving or at least every five minutes of time:
 - Clock time,
 - Station location,
 - Paver track speed, and
 - Operating frequency of individual vibrators.

Provide an electronic copy containing the record of data after the completion of the concrete paving operation. Provide vibration data daily as directed by the Engineer.
6. Regulate the rate of progress of the vibratory equipment and the duration of the application to fully, but not excessively, vibrate the concrete. If the forward progress of the paver stops, suspend the operation of vibrators.
7. Attach vibrators to spreading or finishing equipment. Do not allow vibrators to come in contact with preset dowel basket assemblies, the grade, pavement reinforcement, or side forms. Do not allow the operation of vibrators to cause separation or segregation of the mix ingredients, including the downward displacement of large aggregate or the accumulation of laitance on the concrete surface. The Contractor may reduce the vibration frequency within the specified range if reducing the forward progress of the paver to avoid segregation of the concrete mix. Connect the power to all vibrators so that they cease when the machine motion is stopped. Stop paving operations if a vibrator fails to operate within the range specified above.

8. Operate the slipform paver with a continuous forward movement, and coordinate all operations of mixing, delivering, and spreading concrete to provide uniform progress with minimal stopping and starting of the paver.
9. At the Contractor's option: equip the paver with automatic grade control capable of maintaining the elevation shown on the plans at both sides of the paver. Control the elevation of one side and control the crown, or control the elevation of each side independently. The Contractor may elect to use stringless paving, as long as he meets the required grade and cross slope.
10. Tightly stretch a wire or string line set parallel to the established grade for the pavement surface to achieve the grade reference. Set the control reference and support the line at intervals to maintain the established grade and alignment.

B. Fixed-Form Construction

1. Place concrete using one or more machines to spread, screed, and consolidate between previously-set side forms. Vibrate these areas using hand-held or machine-mounted internal vibrators.
2. Use a tachometer or similar device to demonstrate to the Engineer that the paving equipment vibration meets the requirements in this section.
3. Use hand-held vibrators to consolidate concrete adjacent to side forms and fixed structures. Operate the hand-held vibrators at a speed of at least 3,600 VPM (60 Hz). Do not allow the vibrator head to contact the joints, load transfer devices, reinforcement, grade, or side forms. If the vibrator fails, suspend operations and remove unconsolidated concrete.
4. Continue vibration to achieve adequate consolidation, without segregation, for the full depth and width of the area placed.
5. Provide an adequate number and capacity of machines to perform the work at a rate equal to the concrete delivery rate.
6. Strike off concrete with a vibrating screed, laser screed, or a roller/clary screed as reviewed by the Engineer. Finish small or irregular areas that are inaccessible to finishing equipment using other methods as reviewed by the Engineer.
7. Discontinue any operation that displaces the side forms from the line or grade or that causes undue delay, as determined by the Engineer, due to mechanical difficulties.

C. Hand-Finishing Equipment: Provide all finishing tools necessary for proper finishing of the concrete including straightedges for checking and correcting finished concrete surfaces.

D. Forms

1. Rigid forms: Steel, minimum thickness of five gage and height at least equal to design thickness of pavement with base width at least 6 inches.

- a. Minimum section length of 10 feet and joint connections designed to allow horizontal and vertical adjustment with locking device to hold abutting sections firmly in alignment.
 - b. Bracing, support, and staking must prevent deflection or movement of forms.
- 2. Flexible forms: Use steel, plastic, or wood flexible forms for curves with a radius less than 100 feet.
 - a. Bracing, support, and staking must prevent deflection or movement of forms.
 - b. Ensure that forms used to shape back of curbs at returns have height at least equal to design thickness of pavement and curb height.
 - c. Forms must be free from scale and surface irregularities.
- E. Curing Equipment: Before application, agitate the curing compound as received in the shipping container to obtain a homogenous mixture. Protect membrane-curing compounds from freezing before application. Handle and apply the membrane-curing compound in accordance with the manufacturer's recommendations. An airless spraying machine is required to have the following:
 - 1. A recirculating bypass system that provides for continuous agitation of the reservoir material,
 - 2. Separate filters for the hose and nozzle, and
 - 3. Multiple or adjustable nozzle system that provides for variable spray patterns.
- F. Concrete Saws: Use power-operated concrete saws capable of cutting hardened concrete without damage.
- G. Joint Sealing Equipment: Use equipment capable of cleaning the joint and heating and installing sealant in joints according to manufacturer's recommendations.

3.5 Concrete Pavement Construction

- A. Removal of Pavement: Comply with plans.
- B. Final Subgrade/Subbase Preparation
 - 1. General
 - a. Meet the requirements of the plans for subgrade construction, subgrade treatment, and subbase construction.
 - b. Trim the subgrade or subbase to the final grade for placement of concrete.
 - c. Unless otherwise ordered by the Engineer, the subgrade or subbase, at time of placing concrete for concrete pavement, must be in a uniformly moist but not muddy condition to a depth of not less than 1 inch.

2. Subgrade and subbase loading

- a. Travel of construction traffic including concrete delivery trucks on a subgrade or subbase must be with written approval by the Engineer. In such cases, watering of the subgrade or subbase must be limited to just ahead of the paving machine.
- b. Enter and exit from side streets to minimize repetitive loading on the subgrade or subbase by concrete trucks.
- c. Do not allow loads in excess of the legal axle load on the completed subgrade or subbase.
- d. Partially loaded trucks may be required.

3. Paving suspended

- a. Suspend the paving operation where subgrade or subbase stability has been lost.
- b. Do not place concrete on a subgrade or subbase that has become unstable, bears ruts or tire marks of equipment, or that is excessively softened by rain until such subgrade or subbase has been reconsolidated and reshaped to correct the objectionable condition.
- c. If necessary, scarify to a minimum depth of 6 inches, aerate, and recompact at no additional cost to the Engineer. Meet the compaction requirements of the plans.

4. Maintenance of subgrade or subbase: Maintain the completed subgrade or subbase during subsequent construction activities.

C. Surface Fixture Adjustment

- 1. Adjust manhole frames and other fixtures within area to be paved to conform to finished surface. Comply with plans for manhole adjustments and water fixture adjustments.
- 2. Clean outside of fixture to depth of pavement before concrete placement.
- 3. Construct boxouts if necessary for later adjustment of fixtures. See plans for the size and shape of the boxout.

D. Setting of Forms: When forms are used, meet the following requirements:

- 1. Ensure forms have sufficient strength to support paving operations being used.
- 2. Set base of forms at or below subgrade elevation with top of forms at pavement surface elevation. With Engineer approval, extra height forms may be used to shape the back of integral curb and edge of pavement; set base at or below subgrade elevation with top of form at top of curb elevation.

3. Place and secure forms to required grade and alignment. Do not vary the top face of the form from a true plane by more than 1/8 inch in 10 feet, and do not vary the vertical face from a true plane by more than 1/4 inch in 10 feet.
4. If the soil supporting the forms is softened by rain or standing water so that the forms are inadequately supported, or if voids occur under the forms, remove forms. Rework subgrade to proper elevation and density, and reinstall forms.
5. Ensure forms are free of latent concrete and coated with release agent before concrete is placed.
6. In the event of rain, remove and reset the forms as necessary to permit drainage.

E. Removal of Forms

1. Do not remove side forms of pavement and back forms on integrant curb earlier than 12 hours after placing the concrete, unless otherwise approved by the Engineer. Remove forms without exerting shock or strain, including temperature variations, on the pavement or curb. Cure concrete in accordance with Section 3.8 of this specification.

F. Paving Protection

1. In the area adjacent to the curbs and pavement edge, immediately place backfill of soil or aggregate according to the plans, without vibration (according to Section 3.10.C), after the forms are removed, to prevent soil erosion during a rain event. Construct dams or other protection to ensure that no saturation or erosion of the subgrade under or near the pavement occurs. This may include check dams, pumping, etc.

G. Reinforcement Protection

1. Ensure bars are clean, straight, free from distortion and rust, and are firmly secured in position as specified in the contract documents. Place all bars in approved storage to prevent damage; do not distribute along the work site except as needed to avoid delay in paving.

H. Placing Reinforcement: Provide and place reinforcement meeting the following requirements and characteristics:

1. Provide epoxy-coated reinforcement in accordance with MnDOT Specification 2472, "Metal Reinforcement."
2. Provide and place reinforcement bars including keyway bars, tie bars, taper steel, and stopper bars.
3. Place keyways as shown on the plans. Keyways are not recommended for pavements 7 inches or less.
4. Provide and place supplemental pavement reinforcement as shown on the plans.

5. Provide and place reinforcement bars on chairs, in stakes, utilizing tie bar basket assemblies or by appropriate equipment for pressing the bars to the specified location.
6. For slipform paving, stake the tie bar steel to the roadbed, or use a mechanical device attached to the spreader or paver to place tie bar steel required for L1T joints as shown on the plans. Space and press the tie bar steel to the depth and location shown on the plans. Do not place tie bars over a dowel bar assembly.
7. Place supplemental pavement reinforcement bar mats for reinforced pavement over culverts when necessary and in accordance with the most current MnDOT Standard Plate 1070 as designated in the plans.
 - a. When reinforced pavement is specified, assemble bar mats accordingly, and firmly fasten together at all bar intersections.
 - b. Place, secure, and tie mats for a continuous mat as specified in the contract documents. Displacement during concrete placement operations is not allowed.
 - c. Use chairs to ensure proper placement of bar mats.
- I. Dowel Bar Assemblies: Provide dowel bar assemblies manufactured in single units for the lane widths shown on the plans, unless otherwise approved by the Engineer. Do not use more than two assembled sections in any one joint for ramps, loops, and tapered sections.
 1. Secure the dowel bar assemblies to prevent movement during concrete placement in accordance with Standard Plate 1103 and the following:
 - a. Provide a Quality Control Plan for Dowel Basket Assemblies in accordance with 2301.3.H.1.a.
 - b. Fasten the baskets to the surface so that they do not move vertically or horizontally more than 1/8 inch [3 mm] from surface.
 - c. Type, location, number and length of anchors are dependent upon field conditions;
 - d. Before paving, demonstrate the fastening method to the Engineer for approval.
 2. Within one hour before covering with concrete, coat the dowel bars with a thin uniform coating of a form coating material in accordance with MnDOT 3902, "Form Coating Material."
 3. Before placing the concrete, mark the location on both sides of each transverse joint as approved by the Engineer. Transfer the markings to the fresh concrete immediately after completing the final finishing operations.
 4. The Contractor may use a mechanical dowel bar inserter to place dowel bars in the pavement as reviewed by the Engineer. Immediately before inserting the dowels, coat the dowels with a thin uniform coating of a form coating material in accordance

with MnDOT 3902, "Form Coating Material." If using a dowel bar inserter, initially and on each production day, demonstrate to the Engineer that the inserted dowel bars in the completed concrete pavement are parallel to the surface and centerline slab and are located at the proper depth according to the plans.

J. Drill and Grout Tie Bars and/or Dowel Bars in Existing Pavement

1. When anchoring in existing concrete, use either a MnDOT-approved epoxy system according to the manufacturer's instructions, or provide and place a bonding grout into the drilled hole by using the steel to push the epoxy or grout into the drilled hole and placing the grout or epoxy around the edge of the steel. The bonding grout shall consist of two parts Portland cement and one part sand, mixed with sufficient water to form slurry with the consistency of thick cream. The Contractor shall mix the grout mechanically.

K. Concrete Pavement Placement

1. Dump or discharge concrete without causing grade displacement or damage to the existing asphalt or bond breaker layer. Repair damage to the grade, existing asphalt, or bond breaker layer as approved by the Engineer. Provide protection for turning concrete trucks.
2. Maintain the grade in a moist condition until placement of concrete.
3. Construct mainline pavement in a single layer of concrete. Place the concrete pavement in one complete pass of the paving machine to minimize the need for hand-finishing.
4. Coordinate paving operations for mixing, delivering, spreading, and extruding the concrete to provide uniform progress of the paver. Use sufficient trucks to ensure a steady forward progress of the paver. If the forward movement of the paver stops for a period long enough to create a cold joint or honeycombing, construct a header joint in accordance with Section 3.5.O "Constructing Joints" of this specification.
5. Do not add water to the surface of the concrete to aid in finishing.
6. When placing concrete on asphalt or asphalt bond breakers, comply with the following:
 - a. Do not place concrete on an asphalt surface with an asphalt surface temperature greater than 120 °F.
 - b. Maintain the asphalt surface in a moist condition as necessary and at a surface temperature not greater than 120 °F before placing the concrete. The Engineer will allow the Contractor to apply water, whitewash of hydrated lime and water, or both to cool the asphalt surface, or other methods allowed by the Engineer.
 - c. Before placing concrete on a milled asphalt surface, clean the milled surface by sweeping and patch as shown on the plans or as directed by the Engineer.
7. When placing concrete adjacent to in-place concrete pavement, protect the following:
 - a. All ends of transverse joints $\frac{3}{16}$ inch or wider to the satisfaction of the Engineer. The Engineer will allow sawing through the existing joint when sawing the newly placed concrete.
 - b. The in-place pavement to prevent damage.

- c. Do not allow the edges of the pavement, including longitudinal joints, to deviate from the line shown on the plans by greater than ½ inch at any point.

L. Integral Curbs

Integral curbs are placed with the pavement in a single paving machine operation; however, hand methods may be allowed for radius, returns, and sections of curb and gutter 100 feet or less in length or in other special sections where mechanical equipment cannot be used.

1. Pave, edge, protect, saw, and cure curb in same manner as pavement.
2. Finish curb as rapidly as finishing operations on pavement permit. Maximum distance behind paving machine is 100 feet.
3. Complete final finish on curbs by hand methods, including the use of a 6-foot straightedge.
4. Check surfaces of curb and gutter with 10-foot straightedge; correct variations greater than ¼ inch.
5. For drop curb at driveways and where sidewalks intersect streets, use forms to shape the backs of such curbs.
6. When using hand methods for building curb, the following additional requirements will apply:
 - a. Remove free water, latency, dust, leaves, or other foreign matter from the slab prior to placing concrete for curb.
 - b. Use freshly mixed concrete; do not store concrete in receptacles at side of pavement for use in curb at a later time; do not use concrete requiring retempering.
 - c. Consolidate curb concrete to obtain adequate bond with the pavement slab and to eliminate honeycomb in the curb. Avoid disturbing the alignment of forms or the gutter flow line.

M. Finishing

1. Grade and crown: Strike off the surface to the true section by the screed promptly after concrete has been placed and vibrated. Finish the surface true to crown and grade.
2. Watering the surface: Do not add water to the surface of the concrete to aid in finishing.
3. Floats: Finish surface with wood or magnesium floats; finish from both sides simultaneously if pavement is placed to full width with one pass of paving machine.
4. Straightedging
 - a. After the longitudinal floating has been completed and the excess water has been removed, and while the concrete is still plastic, test the pavement surface for trueness.
 - b. Immediately fill any depressions found with freshly mixed concrete, strike off, consolidate, and refinish.

- c. Check surface longitudinally while concrete is still plastic; correct any surface deviations greater than ¼ inch in 10 feet.
- 5. Surface treatment
 - a. Drag surface treatment: Unless otherwise specified, texture the finished surface with an artificial turf or broom to produce a minimum depth of texture of 0.8 mm.
 - i. Pull the artificial turf or burlap drag longitudinally over the finished surface to produce a tight, uniform, textured surface, and round the edges in a workmanlike manner.
 - ii. Remove the artificial turf or brooms from the pavement surface at regular intervals and clean with water to remove accumulated concrete from the fabric in order to maintain a consistent finished texture.
- 6. Edge finish: Before the concrete has taken its initial set, finish all edges of the pavement with an 1/8-inch-radius edging tool.
- N. Curing – See Section 3.8 of this specification for curing requirements.
- O. Construction of Joints
 - 1. General
 - a. Construct joints of the type and dimensions and at the locations specified in the contract documents.
 - b. Place longitudinal joints coincident with or parallel to the pavement centerline.
 - c. Place all transverse joints at right angles to the centerline and extend the full width of the pavement.
 - d. Place all joints perpendicular to the finished grade of the pavement and do not allow the alignment across the joint to vary from a straight line by more than 1 inch.
 - e. Exercise care in placing, consolidating, and finishing the concrete at all joints.
 - 2. Saw joints
 - a. Submit a jointing plan to the Engineer for approval prior to placing concrete.
 - b. Saw all mainline concrete pavements; no tooling of joints will be allowed.
 - c. Mark joint locations with a string line before sawing.
 - d. Begin transverse joint sawing as soon as the concrete has hardened sufficiently to allow sawing without raveling or moving of aggregate. Saw joints before uncontrolled cracking takes place.
 - e. Provide either wet-cut saws referred to as a “conventional concrete saw,” or a lighter weight dry-cut saw, referred to as an “early entry concrete saw,” to establish joints sooner than the conventional saw.
 - f. Saw all joints in a single cutting operation for a specific joint. Make saw cuts true to line and to the dimensions specified in the contract documents. Extend transverse joints in the pavement through the integrant curb at the same time as the pavement joint is cut.

- g. Discontinue sawing a joint if a crack develops ahead of the saw and rout open the crack for sealing.
 - h. If necessary, continue the sawing operations both day and night. Night operations will require the approval of local agencies in regard to any noise regulations.
 - i. The concrete must be capable of supporting the sawing operations to allow the use of an early green concrete saw.
 - j. Repair or replace pavement with uncontrolled or random cracking at no additional cost to the Engineer. Use repair methods approved by the Engineer. Repair or replace at the direction of the Engineer.
 - k. Use wet sawing for dust control when specified in the contract documents.
 - l. Where boxouts occur in pavement, construct joints as shown on the plans.
3. Contraction joints
- a. Place longitudinal and transverse construction joints where specified in the contract documents, at boxouts, and at headers.
 - b. Locate and place forms for boxouts on grade prior to paving as shown on the plans.
 - c. If concrete placement is delayed for more than 60 minutes or at the end of each day, construct a header transverse construction joint within 5 feet of a planned transverse contraction joint.
 - d. Finish the edges of the pavement at construction joints with an 1/8-inch-radius edging tool.
 - e. If a random crack occurs away from the planned joint location, repair the crack with one of the following techniques.
 - i. If the pavement is undoweled and the random crack is at least 3 feet from the planned joint: Rout and seal the random crack and epoxy the planned joint closed if it has not cracked open.
 - ii. If the pavement is undoweled and the random crack occurs within 3 feet of the planned joint and the planned joint has cracked open: Repair with a 4-foot full-depth repair. If the planned joint has not cracked open, then rout and seal as above.
 - iii. If the pavement is doweled and the random crack occurs at least 3 feet from the planned joint: Repair with a dowel bar retrofit repair and rout and seal the crack.
 - iv. If the pavement is doweled design and the crack occurs within 3 feet of the planned joint: Repair with a 4-foot full-depth repair.
4. Isolation/expansion joints
- a. Install isolation joints as specified in the contract documents.
 - b. Prevent movement of or damage to joint assembly when placing concrete.
 - c. Use supplemental vibration equipment for proper consolidation of the concrete.

- d. After the surface finishing has been completed, finish the edge of the joint with an 1/8-inch edging tool.
- 5. Constructing headers
 - a. Construct construction headers, temporary headers, and permanent headers as shown on the plans.
 - b. The Engineer will not allow incorporating any concrete accumulated in the grout box of the paver into the pavement. Construct all headers such that the concrete contained in the grout box is removed from the project. Use any approved construction header method as shown in the Standard Details.
 - c. Use internal vibration to consolidate the concrete along header joints before final finishing.
- P. Joint sealing
 - 1. Timing
 - a. Unless otherwise allowed or reviewed by the Engineer, before any portion of the pavement is opened to the Contractor's equipment or to general traffic, clean and seal joints that require sealing.
 - b. The Engineer may limit the wheel loads and axle loads of equipment operating on the pavement during this operation prior to the age of seven days and/or until a strength of 3000 psi is achieved. If the Contractor wants to proceed sooner, he will need to perform additional strength tests to determine the pavement strength.
 - 2. Cleaning: Perform joint sealing as shown on the plans and in accordance with the following:
 - a. Seal joints after the Engineer inspects and approves the joints.
 - b. Perform joint sealing on surface dry concrete after cleaning the joints of debris, dirt, dust, and other foreign matter, including accumulations of concrete.
 - c. Lightly sandblast the joint walls before final compressed air cleaning.
 - d. Immediately before sealing the joints, clean the joints with a jet of compressed air under pressure of at least 85 psi.
 - e. Seal transverse integrant curb joints with the same joint sealer used to seal the pavement joints.
 - f. Seal joints in accordance with the tolerances shown on the plans.
 - g. Provide backer rod material compatible with the sealer as shown on the plans.
 - h. Remove and replace sealer at joints filled above the permissible level shown on the plans at no additional cost to the department.
 - i. Handle and place joint sealer material as recommended by the manufacturer and in accordance with the following requirements.
- Q. Hot-Poured Sealers
 - 1. Heat hot-poured sealers in a double-boiler-type kettle or melter. Fill the space between inner and outer shells with oil or other material as allowed by the manufacturer.

2. Provide heating equipment with automatic temperature control, mechanical agitation, and recirculating pump. Use heating equipment as recommended by the manufacturer of the sealer material.
3. Do not melt quantities of sealer material greater than the quantity used within the same day. After heating the sealer material to the application temperature, maintain the material temperature until placement. Place the sealer material within four hours after the initial heating to the application temperature.
4. Apply hot-poured sealant to the pavement at ambient pavement temperatures greater than 39 °F.

3.6 Curb and Gutter Construction

A. Slipform Paving

1. Use a slipform machine for all curb and gutter sections except in areas where the curb machine is not able to work.

B. Joint Construction

1. Place ½-inch expansion joints transversely at the ends of curved sections and at the ends of the curved portions of entrance and street returns. Place longitudinal expansion joints as shown on the plans. Place expansion joints at locations where the concrete surrounds or adjoins an existing fixed object, such as a fire hydrant, building foundation, or other rigid structure.
2. Provide contraction joints at the following intervals, except as otherwise shown on the plans:
 - a. Adjacent to bituminous mainline, every 10 feet.
 - b. Adjacent to concrete mainline, match concrete mainline transverse joints.
 - c. In solid median construction, every 10 feet.
3. Form or saw the contraction joints, as reviewed by the Engineer, to a depth of at least 2 inches deep.
4. Align joints with joints in adjoining work unless a ½-inch preformed isolation/expansion joint isolates the work. Place transverse joints at right angles to the centerline of the pavement unless otherwise required by the contract.
5. Use an edging tool with a radius no greater than ½ inch to round edges of longitudinal construction joints between a concrete median or gutter section and a concrete pavement.
6. Do not saw or seal longitudinal construction joints between a concrete median and concrete pavement, or between a gutter section and concrete pavement.

C. Surface Treatment

1. Surface finish with a fine concrete finishing broom in the transverse direction.

3.7 Sidewalk Construction

A. Joint Construction

1. Divide the walk into square panels of uniform size no greater than 36 square feet and outlined with contraction or expansion joints as shown on the plans.
2. Provide straight joints parallel with or at right angles to the walk centerline. Align the joints with joints in adjoining work unless isolated by ½-inch preformed isolation material.
3. The Contractor may form or saw the joints in walking surfaces as approved by the Engineer. If forming the joints, round joints within the walking surface with a ¼-inch-radius grooving tool, and round edges of the walk with an edging tool having a radius no greater than ½ inch.
4. Extend contraction joints to a depth of at least 1/3 of the walk thickness. If saw cutting, provide a minimum of ¾-inch-wide contraction joints.
5. Provide isolation/expansion material in accordance with MnDOT 3702, "Preformed Joint Fillers," that is, ½-inch wide and equal in depth to the full thickness of the walk.
6. Modify joint construction if a fixed object or structure extends through the walk, as directed by the Engineer. Place isolation/expansion material ½-inch thick adjacent to fixed objects to separate the object from the abutting concrete edges.

B. Surface Treatment

1. Surface finish with a fine concrete finishing broom.

3.8 Curing of All Concrete

An airless spraying machine is required for curing all concrete. Airless sprayers may be used for small and irregular areas provided they have the ability to mix the curing compound in the container and maintain open nozzles.

Apply the curing compound in accordance with the following:

- A. Apply liquid curing compound in a fine spray to form a continuous, uniform film on the horizontal surface and vertical edges of pavement, curbs, and back of curbs immediately after surface moisture has disappeared, but no later than 30 minutes after finishing. With approval of the Engineer, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties to ensure acceptable macro texture is achieved and bleed has evaporated.
 1. For concrete pavement, use MnDOT-approved 3754 AMS white pigment liquid curing compound for all concrete surfaces.

2. For all other concrete and colored concrete pavement, use either a MnDOT-approved 3754 AMS white pigment liquid curing compound or a MnDOT approved 3753 curing compound with a fugitive dye. The Engineer may approve the use of a clear curing compound.
 3. Apply curing compound to all concrete surfaces at an application rate of 150 square feet per gallon. Apply homogeneously to provide a uniform solid coverage on all exposed concrete surfaces (equal to a white sheet of typing paper when using pigmented curing compound). Some MnDOT-approved curing compounds may have a base color (i.e., yellow) that cannot comply with the above requirement. In this case, provide a uniform solid opaque consistency meeting the intent of the above requirement.
- B. Ensure liquid curing materials are well agitated in the supply drum or tank immediately before transfer to the sprayer. Keep curing materials well agitated during application.
 - C. If forms are used, apply to pavement edges and back of curbs within 30 minutes after forms are removed.
 - D. Failure to comply with these curing specifications will result in a monetary deduction of at least \$50.00 per cubic yard or 50 percent of the Contractor-provided invoice amount for the concrete in question
 - E. If the curing compound is damaged during the curing period, immediately repair the damaged area by respraying.
 - F. If the Engineer determines that the initial or corrective spraying may result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Engineer.

3.9 Concrete Protection – Include These Plans in the Contractor’s Quality Control Plan

- A. Protection Against Rain: Protect the concrete from damage due to rain. Have available materials for protection of the edges and surface of concrete. Should any damage result, the Engineer will suspend operations until corrective action is taken.
- B. Protection Against Cold Weather
 1. If the National Weather Service forecast for the construction area predicts air temperatures of 36 °F or less within the next 24 hours and the Contractor wishes to place concrete, submit a cold weather protection plan.
 2. Protect the concrete from damage including freezing due to cold weather. Should any damage result, the Engineer will suspend operations until corrective action is taken.
 3. Cold Weather Protection Plan: Submit in writing to the Engineer a proposed time schedule and plans for cold weather concrete protection that provide provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the Contractor's cold weather protection plans.

C. Protection Against Hot Weather

1. If the National Weather Service forecast for the construction area during concrete placement is such that the combined factors of temperature, wind, and humidity are detrimental to concrete placement, develop a hot weather protection plan.
2. The definition of hot weather conditions is defined in the *PCA Design and Control of Concrete Mixtures* as when the rate of evaporation of bleed water per hour exceeds 0.2 lb. of water per square foot per hour. A chart published by ACI and PCA can be used to predict the bleed water rate.
3. Hot Weather Protection Plan: Submit in writing to the Engineer a proposed time schedule and plans for hot weather concrete protection that provide provisions for adequately protecting the concrete during placement and curing. Do not place concrete until the Engineer accepts the Contractor's hot weather protection plans.

3.10 Opening Concrete to Traffic

A. Opening Pavement and Driveways to Traffic

1. Do not open a new pavement slab to general public traffic or operate paving or other heavy equipment on it until the concrete has attained an age of seven days or it has reached a minimum compressive strength of 3,000 psi, as reviewed by the Engineer.
2. If the pavement joints are widened, seal the joints before operating paving or other heavy equipment and allowing general public traffic on the pavement.
3. Cast the compressive strength control specimens in accordance with ASTM C31, "Making and Curing Concrete Test Specimens in the Field." Cure the control specimens in the same manner and under the same conditions as the pavement represented. The Engineer will test the control specimens in accordance with Concrete Sampling and Testing, Table 5 or 6.
4. Perform operations on new pavement as reviewed by the Engineer and in accordance with the following:
 - a. When moving on and off the pavement, construct a ramp to prevent damage to the pavement slab.
 - b. Operate the paving equipment on protective mats to prevent damage to the pavement surface and joints. Before placing the protective mats, sweep the pavement surface free of debris.
 - c. Operate equipment on a slab without causing damage. If damage results, suspend operations and take corrective action as reviewed by the Engineer. Do not operate the equipment wheels or tracks within 4 inches of the slab edge.

B. Opening of Sidewalks and Medians to Pedestrian Traffic

1. Normal pedestrian foot traffic can walk on the finished concrete as soon as practical without causing damage to the fine broom finish.
2. Construction traffic shall not be allowed for three days or until the concrete reaches a compressive strength of 3000 psi.

C. Backfill Construction – Operating Vibratory Equipment

1. Protect newly placed concrete from damage by adjacent vibratory or backfilling operations for a minimum of 24 hours.
2. Do not perform vibratory operations and backfilling until 72 hours after placing the concrete or after the concrete reaches a compressive strength of at least 3000 psi.

3.11 Contractor Submittal Requirements

- A. Submittals: Follow these *Minnesota Concrete Flatwork Specifications* and any local covenants, as well as the following:
1. All submittals of drawings; manufacturers' certificates of compliance, recommendations, and test data, reports, catalog data sheets; and other data shall be in accordance with the submittals section, unless otherwise specified herein.
 2. Two weeks prior to commencing any concrete placement, submit a concrete mix design for each different source of aggregate for review by the Engineer.
 3. Two weeks prior to commencing any concrete placement, submit a Quality Control plan which includes all of the following:
 - a. Traffic control plan.
 - b. A list of all process control or quality control testing technicians.
 - c. Concrete placement plan.
 - d. Concrete washout guidance plan.
 - e. Pre-pour meeting dates for pours over 500 cubic yards.
 - f. Procedure for placing dowel bars and reinforcement.
 - g. Concrete curing plan.
 - h. Rain protection plan.
 - i. Cold weather protection plan.
 - j. Hot weather protection plan.

- k. Submit to the Engineer an organizational chart listing names and phone numbers of individuals and alternates responsible for mix design, quality control administration, and inspection.
- l. Submit the smoothness profiler information, including which machine and operator, when specified by the Engineer for concrete pavement.
- m. The Contractor is responsible for developing the maturity curve for the specified mix, taking maturity readings, and delivering a copy of the results to the Engineer when required in the contract. The Contractor will provide any equipment necessary to monitor the maturity in the field.

3.12 Concrete Sampling and Testing Requirements

- A. Turn in all field test results to the Engineer or owner's representative using MnDOT's weekly concrete report form 2448 and the Concrete Ready-Mix Plant QC Workbook turned in weekly.
- B. Prior to the first pour at each concrete plant, the Contractor needs to submit a Contact Report /Ready Mix Form 2163 and the Aggregate Quality report.
- C. The testing rates shown in this section are minimums. Take all samples in a random manner using an appropriate random number generator. Take as many tests as necessary to ensure quality control.
- D. If any field test fails, reject the concrete, or if the producer makes adjustments to the load to meet requirements, record the adjustments on the certificate of compliance and the weekly concrete report. Retest the load and record the adjusted test results. Make sure the load is tested before it gets into the work.
- E. All people performing field testing of plastic concrete will carry either a current MnDOT or ACI Concrete Field 1 concrete testing certification. All people performing gradations and moistures will carry either a current MnDOT Concrete Plant 1 or an ACI Aggregate Testing Technician Level 1 certification.
- F. All concrete shall come from a MnDOT-certified ready-mix plant, and all people performing plant testing will carry a current MnDOT Concrete Plant 1 certification.
- G. Fabricate strength specimens in accordance with ASTM C31. Provide moist curing environments of adequate size and number for initial and final curing of strength specimens in accordance with ASTM C31.
- H. Record the results of each field test of plastic concrete on the Certificate of Compliance ticket and note whether it is a Contractor test or an Agency test.
- I. The Producer shall perform all plant testing according to Table 5 for **all concrete** placed.
- J. The Engineer shall perform testing according to Table 5 for **all concrete placed**. If the Engineer includes a Pay Item for Concrete Testing according to Table 5, the Contractor will inform the Engineer at the pre-construction meeting who the third party is that will perform testing for the Engineer.

Table 5 Minimum Testing Rates for Curb and Gutter, Sidewalks, and Pavements			
Test Type	MnDOT Spec or ASTM No.	Producer Testing Rates	Engineer Testing Rates
Gradation	MnDOT 3126 MnDOT 3137 ASTM D75 ASTM C702 ASTM C117	Coarse and fine: 1 per 400 yd ³ or as directed by the Engineer	1 per project
Moisture Content	MnDOT 2461	1 every four hours	At Engineer's discretion
Aggregate Quality	Table 3 Table 4	Minimum of 1 per project – use of MnDOT test results for the same 30-day time period is acceptable	Minimum of 1 per project – use of MnDOT test results for the same 30-day time period is acceptable
Coarse Aggregate Testing (% Passing 200)	MnDOT 3137 ASTM C117	Minimum of 1 per project – use of MnDOT test results for the same 30 -day time period is acceptable	Minimum of 1 per project – use of MnDOT test results for the same 30 -day time period is acceptable
Air Content	ASTM C231		Test first load each day per mix, then 1 test per 200 yd ³
Slump	ASTM C 143		Test first load each day per mix, then 1 test per 200 yd ³ , slump test not required for slipform placement
Temperature	ASTM C 1064		Record temperature each time air content, slump, or strength test specimen is performed/fabricated
Compressive Strength	ASTM C 31		Test first load each day per mix, then 1 test (set of 3) per 200 yd ³ , minimum of 1 (set of 3) per day if production is more than 50 yd ³ . Record slump, temperature, and air content for each cylinder
Concrete Pavement Thickness			Observation of probing or coring at their discretion.

K. Air Content

1. Evaluate air content of the concrete according to ASTM C231, the pressure meter; ASTM C138, using the gravimetric unit weight method; or ASTM C 173, the volumetric method.
2. For concrete paving, once per day run an air test in front of the paver and then run an air test immediately behind the paver to aid in identifying air loss through the paver. A test result between 5 percent and 8 percent behind the paver will be considered compliant. This test will represent all concrete from the back of the paver back to the last documented complying test. Make immediate adjustments to the mix production and placement process to bring the air content back within tolerance. Do not use succeeding loads below the lower target air content tolerance by more than 0.5 percent. Test each subsequent load until air content is within tolerance for two consecutive loads. For all incorporated, non-complying concrete that is out of tolerance, the Engineer will review and determine if removal and replacement is required or if a price adjustment according to Table 6 will be applied.

Table 6 Air Content Penalties Target of 6.5% with a Range of 5% – 8.5%	
Air Content, %	Adjusted Contract Unit Price for the Type of Concrete Placed
> 10.0	The Engineer will determine the concrete suitability for the intended use in accordance with “Conformity with Contract Documents” and “Unacceptable and Unauthorized Work” as reviewed by the Engineer.
>8.5 – 10.0	The Engineer will provide a monetary adjustment of -\$25.00 per cubic yard for the concrete placed as approved by the Engineer.
5.0 – 8.5	The Engineer will pay 100 percent of the contract unit price for the concrete represented, for material placed as approved by the Engineer.
>4.0 – <5.0	The Engineer will provide a monetary adjustment of -\$25.00 per cubic yard for the concrete placed as approved by the Engineer.
>3.5 – 4.0	The Engineer will provide a monetary adjustment of -\$75.00 per cubic yard for the concrete placed as approved by the Engineer. The Engineer may also require coating the surface with an approved epoxy penetrant sealer from the MnDOT Approved Products list.
§ 3.5	Remove and replace concrete in accordance with “Conformity with Contract Documents” and “Unacceptable and Unauthorized Work” as reviewed by the Engineer. If the Engineer will determine if the concrete can remain in place, the Engineer will not pay for the concrete and the Engineer may also require coating the surface with an approved epoxy penetrant sealer from the MnDOT Approved Products list.

- L. Concrete pavement smoothness.** All concrete pavement bid items are governed by the straightedge evaluation unless a bid item is used to pay for the ALR evaluation.

1. Straightedge evaluation: The Engineer will allow variations less than or equal to ¼ inch within the span of a 10-foot straightedge in the longitudinal or transverse direction to remain in place without correction or penalty. The Engineer will require corrective work on surface deviations greater than ¼ inch within the span of the 10-foot straightedge in any direction. For corrected variations, the Engineer will accept

deviations less than or equal to ¼ inch within the span of a 10-foot straightedge in any direction.

2. Areas of Localized Roughness (ALR)

- a. “Areas of localized roughness” (ALR) is defined as areas greater than or equal to the limiting criteria for a continuous IRI calculation with a 25 feet [7.62 m] interval, as calculated using the FHWA’s Profile Viewing and Analysis (ProVAL) software.
- b. Provide a department-certified, calibrated, and documented IP meeting the requirements of ASTM E 950, Class 1 and procedures maintained by the MnDOT Pavement Engineering Section. Refer to the procedures maintained by the MnDOT Pavement Engineering Section or to the MnDOT Smoothness website for the required settings for individual certified profilers.
- c. The Contractor shall provide an operator trained in the operation of the particular Inertial Profiler they will use to measure the smoothness and knowledgeable in the use of the required “Profile Analysis Software, Proval.” Ensure profiler operators pass a proficiency test and possess a current certification issued by MnDOT. The Contractor may access a list of certified operators on the MnDOT Smoothness website. Provide documentation of operator certification to the Engineer.
- d. Remove objects and foreign material from the pavement surface before performing the pavement surface evaluation. Provide traffic control required for testing and performing corrective work on the final pavement surface.
- e. Run the IP in the direction of traffic. Measure the profile in the right wheel path of each lane.
- f. Areas that will be exempt from the ALR specification shall be 10 feet on either side of a manhole, water valve, or any other utility obstruction in the driving lanes. Intersections and areas purposefully designed for drainage will be exempt from the ALR specification, as approved by the Engineer.
- g. Test and evaluate each lane separately. The Engineer will determine the length in miles [kilometers] of each mainline traffic lane. Operate the IP at the optimum speed as recommended by the manufacturer.
- h. Separate each lane into segments 0.1 mi [0.1609 km] in length. Evaluate the remainder segment less than 0.1 mi [0.1609 km] in each lane as an independent segment. The Engineer will prorate pay adjustments for length.
- i. Make each pass continuously, regardless of length, and end passes before exclusions. Begin each subsequent pass 50 feet [15.24 m] before, and including, construction headers and end-of-day work joints. In concrete pavements, evaluate terminal headers tying into existing portland cement concrete pavement.
- j. Submit a printout containing the inertial profiler’s settings, each segment’s IRI values, and the signature of the operator to the Engineer on the same day of the profiling.

- k. Submit electronic files in ERD format representing the raw data from each pass on the same day of the profiling.
- l. If the Contractor fails to submit actual data to the Engineer on the day of profiling, the Engineer may require the Contractor to reprofile the measured segments.
- m. Identify ALR using the ProVAL “smoothness assurance” analysis, calculating IRI with a continuous short interval of 25 feet with the 250 mm filter. Use only the right wheel path to determine ALR.
- n. The Engineer will evaluate ALR in accordance with Table 7, “ALR Monetary Deductions and Corrective Work Requirements.”

Table 7 Concrete Pavements Only ALR Monetary Deductions and Corrective Work Requirements		
Equation	25 ft. Continuous IRI, in/mi	Corrective Work or Monetary Deduction, per linear 1.0 ft.
Concrete pavements with a posted vehicle speed greater than 45 mph	< 125.0	Acceptable
	Š 125.0 to < 175.0	\$10.00
	Š 175.0 to < 250.0	Corrective work or \$25.00, as directed by the Engineer
	Š 250.0	Corrective work or \$50.00, as directed by the Engineer
Concrete pavements with a posted vehicle speed of 45 mph or less and concrete intersections constructed under traffic	< 175.0	Acceptable
	Š 175.0 to < 250.0	\$10.00
	Š 250.0	\$25.00

- o. Corrective work
 - i. If the summary reports indicate any ALR, submit a written corrective work plan to the Engineer in accordance with Table 7, “Corrective Work.” Include the beginning and ending points of locations planned for correction in the corrective work plan. Do not begin corrective work before the Engineer approves the plan.
 - ii. If the Engineer elects to assess a monetary deduction for ALR in accordance with Table 7 instead of requiring corrective work, submit a final spreadsheet summary.

- iii. Notify the Engineer at least 24 hours before beginning corrective work. Do not begin corrective work before the Engineer approves the methods and procedures in writing.
- iv. Perform corrective work using a surface diamond-grinding device consisting of multiple diamond blades, unless otherwise approved by the Engineer. Repair and replace joint sealant damaged by diamond grinding on concrete pavement as directed by the Engineer and at no additional cost to the department.
- v. Perform smoothness corrective work for ALR across the entire lane width. Maintain the pavement cross slope through corrective areas.
- vi. Perform surface corrections before placing permanent pavement markings. Replace permanent pavement marking damaged or destroyed by corrective work at no additional cost to the department.
- vii. The Engineer will consider ALR acceptable if the retested segment contains no ALR. The Engineer will reduce payment for ALR remaining after retesting as determined by the Engineer and in accordance with Table 7, "ALR Monetary Deductions and Corrective Work Requirements."
- viii. After reprofiling, submit a paper summary ProVAL report for each lane, indicating the results of updated "smoothness assurance" analyses to the Engineer. Submit a spreadsheet summary in tabular form, with each 0.1 mile segment occupying a row to the Engineer. The Contractor may access an acceptable spreadsheet summary template in electronic form on the MnDOT Smoothness website.

M. Pavement Thickness

- 1. Thickness requirements: Provide pavement with a finished pavement thickness as shown on the plans or as modified, in writing, by the Engineer.
- 2. Procedure: Construct pavement to the thickness shown on the plans. On each project and on each pavement, evaluate pavement thickness in accordance with the following:
 - a. The Engineer defines plan thickness lot (PTL) as concrete pavement of the same thickness added together lineally. Establish a separate PTL for each concrete plan thickness on the project. The Engineer defines a subplot as the rate at which an individual measurement is taken over a given length. The Engineer considers a subplot as one lane wide, measured in accordance with the following:
 - i. From the pavement edge to the adjacent longitudinal joint,
 - ii. From one longitudinal joint to the next, or
 - iii. In the absence of a longitudinal joint, between pavement edges.

- b. The Engineer will divide the PTL into sublots of 500 lineal lane feet to determine the QCP locations. The Engineer will add partial sublots less than 500 feet to the previous lot. The Engineer will consider partial sublots equal to or greater than 500 lineal lane feet as individual sublots. If the PTL for the entire project is less than 500 lineal lane feet, the Engineer will consider the PTL as an individual subplot. The Engineer will identify the QCP thickness measurement locations in accordance with the following:
 - i. Determine the longitudinal locations using random numbers multiplied by length of the subplot.
 - ii. Determine the transverse offset locations using a random number multiplied by the width of the traffic lane, ramp, or loop at the determined longitudinal location.
 - iii. Adjust the location to ensure the Contractor takes no measurements within 1 foot of the pavement edge and takes no measurements within 2 feet of any transverse or longitudinal joint or other obstructions.
- c. Contractor QCP Probing Equipment and Probing Method: Provide the following equipment as approved by the Engineer to perform QCP probing:
 - i. Probing rod meeting the following characteristics and requirements:
 - ⌘ Non-flexing,
 - ⌘ Length capable of completely penetrating the pavement for measuring,
 - ⌘ Utilizes a circular or square top plate,
 - ⌘ Contains a centrally located hole in the top plate with a diameter allowing for easy maneuvering along the length of the probing rod, and
 - ⌘ Fitted with a locking device fixing the angle between the top plate and the probing rod at 90 degrees when locked.
 - ii. Work bridge meeting the following characteristics and requirements:
 - ⌘ Spans the full width of the freshly laid concrete,
 - ⌘ Supports a person, and
 - ⌘ Height above the concrete allows for the use of the probing device.
 - iii. Tape measure accurate to nearest 1/8 inch and with a length capable of measuring the depth of penetration of the probing device into the plastic concrete pavement.
- d. Contractor Quality Control Probing (QCP)

- i. Measure the pavement thickness of freshly finished concrete pavement at a **rate of 1 per 500 lineal feet** per lane of pavement.
 - ii. Place the base plates at the randomly selected locations and anchor the plates to prevent movement during concrete placement. Mark the locations of the base plates to ensure ease of locating the plates after the paver has passed,
 - iii. Position the bridge at the selected locations to reach and locate each point,
 - iv. Assemble the probing device. Keeping the probing rod perpendicular to the pavement surface, insert the rod into the plastic concrete until the rod strikes the base plate,
 - v. Slide the top plate down the probing rod until it contacts the pavement surface, then lock to the probing rod,
 - vi. Withdraw the probing device, and
 - vii. Measure the length of the probing rod inserted into the plastic concrete from the underside of the top plate to the end of the probing rod. Record this measurement to the nearest $\frac{1}{8}$ inch.
 - viii. Provide daily summary reports listing the results of the day's QCP thickness measurements and additional probing results to the Engineer.
- e. Non-conforming thickness
- i. The Engineer will base acceptance of the pavement thickness and price adjustment for deficient thickness on the QCP measurements.
 - ii. The Engineer defines the tolerance limit for pavement thickness as the plan thickness lot (PTL) minus $\frac{1}{2}$ inch. If the QCP measurement shows a thickness deficiency greater than PTL minus $\frac{1}{2}$ inch, take additional probings at the location of the deficient QCP. If any QCP reading shows a thickness deficiency greater than PTL minus $\frac{1}{2}$ inch, consider the pavement defective and take exploratory QCP measurements to isolate the defective area.
 - iii. The Engineer defines the defective pavement area as the entire area surrounding the deficient QCP reading within a traffic lane and between acceptable QCP readings. The Engineer considers the pavement acceptable in the remaining areas as the increment where the probing shows a thickness deficiency no greater than PTL minus $\frac{1}{2}$ inch.
 - iv. For QCP readings showing a pavement thickness greater than the PTL minus $\frac{1}{2}$ inch to 1 inch, the Contractor may leave the pavement in place with a monetary deduction of \$20 per square yard for the defective pavement area, as approved by the Engineer.
 - v. For readings showing a pavement thickness greater than PTL minus 1 inch, the Engineer will determine whether the Contractor will remove and replace

concrete pavement or leave the pavement in place at no cost to the Engineer and apply a monetary deduction of \$20 per square yard for the defective pavement area.

- vi. The Engineer will consider the pavement thickness as conforming provided the deficiency of the final average PTL does not exceed PTL minus 0.10 inch. If the final average PTL is deficient by more than the PTL minus 0.10 inch, the Engineer will pay for the pavement in the PTL at the contract unit price less the monetary deductions in accordance with Table 8, excluding areas of defective pavement.

Table 8 Deductions for Concrete Pavement Thickness Deficiencies	
Thickness Deficiency Exceeding Permissible Deviations, in.	Adjusted Unit Bid Price Per sq. yd. of Payment
0.00 – \bar{S} 0.10	None (tolerance)
0.10 – \bar{S} 0.20	\$0.20
0.20 – \bar{S} 0.30	\$0.40
0.30 – \bar{S} 0.40	\$0.70
0.40 – \bar{S} 0.50	\$1.00
0.50 – \bar{S} 1.00 *	\$20.00

N. Acceptance of Concrete Compressive Strength

A **strength test** is defined as the average (28-day) strength of three (3) cylinders fabricated from a single sample of concrete and cured in accordance with ASTM C31 or the MnDOT Concrete Manual.

The Engineer will consider concrete acceptable provided **both** conditions are met:

- (1) No strength test is less than 3500 psi; and
- (2) The moving average of 3 consecutive strength tests is greater than or equal to 4000 psi. If a project does not establish a moving average of 3 consecutive strength tests, use either the single strength test or the average of 2 strength tests to determine acceptance.

If the moving average of three (3) consecutive strength tests falls below 87.5% of f'_c , the Contractor will make immediate adjustments to the Concrete Mix Design in question or use an alternate approved Concrete Mix Design.

If any strength test falls below either condition (1) or (2) above, the Contractor and Engineer will mutually agree on an Independent Third Party to investigate the low strength results.

If the Independent Third Party determines the concrete in question is acceptable to remain in place with no additional testing, the Engineer will determine if a price adjustment is required in accordance with Table 10.

If it is determined that the concrete in question is not acceptable:

- (1) The Independent Third Party will core and test the concrete in question in accordance with ASTM C42.
- (2) The Engineer will identify a minimum of three (3) locations for the Independent Third Party to core. The Independent Third Party will take one (1) core at each location.
- (3) The Contractor is responsible for ensuring the core holes are repaired.
- (4) The Engineer will require the Contractor to complete all coring within 14 days of notification of the low-strength concrete.

The Independent Third Party will review the core test results and evaluate in accordance with Table 9, providing all other concrete tests meet requirements.

Table 9 Evaluation of Core Test Results			
Core (average of 3 cores) Test Results:	Engineer Considers Concrete:	Cost of Coring and Testing:	Resolution:
≥ 85% of f'_c	Acceptable to remain in place	Engineer responsibility	No monetary adjustment, and consider any additional actions in accordance with Table 10.
< 85% of f'_c	Unacceptable	Contractor responsibility	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer may not pay for the concrete or will pay at an adjusted Contract Unit Price, and consider any additional actions in accordance with Table 10.

Non-Conforming Material

If the Contractor inadvertently places concrete not meeting the strength requirements into the work, the Engineer will not accept nonconforming concrete at the contract unit price.

For concrete not meeting the moving average of three (3) consecutive strength tests, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the contract unit price for the contract item of the concrete in accordance with Table 10 based upon cylinder strength test results.

Table 10 Deductions for Low-Strength Test Results	
Moving Average of 3 Consecutive Strength Tests	Adjusted Contract Unit Price
> 93.0% of f'_c	The Engineer will provide a monetary adjustment of \$12.50 per cubic yard for the concrete placed as approved by the Engineer.
§ 87.5% and § 93.0% of f'_c	The Engineer will provide a monetary adjustment of \$25.00 per cubic yard for the concrete placed as approved by the Engineer.
< 87.5% of f'_c	Remove and replace concrete in accordance with "Conformity with Contract Documents," and "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Independent Third Party and the Engineer determine the concrete can remain in place, the Engineer will not pay for the concrete.

PART 4. CONCRETE STRENGTH BY THE MATURITY METHOD

4.1 Concrete Strength by the Maturity Method

- A. Determining concrete maturity (time temperature factor, TTF) and estimating in-place concrete strength is a two-step procedure as follows:
 1. Maturity curve: Establish a relationship between the maturity (TTF) and the concrete strength as measured by destructive methods (that is, through testing of concrete cylinders or beams). Develop the maturity-strength curve at the plant site at the beginning of construction using project materials and the project proportioning and mixing equipment.
 2. Field maturity: The second step is the temperature monitoring of the placed concrete. Install temperature probes in the concrete and measure the temperature. From those measurements, along with the age at which the measurements were taken, calculate the maturity (TTF) and use it to estimate the concrete strength. You may also use a maturity meter to determine the maturity value (TTF). Many products are available in the marketplace with embedded probes that transfer data either through a wire connection or wireless. This data is a complete record of the temperature and humidity or the concrete since it was embedded. Some chips can hold either 28 or 56 days' worth of data.
- B. Maturity can be used for any concrete mix on a project, but might be most helpful for early-strength concrete mixes. These mixes are used to open sections of pavement to traffic as soon as possible using maturity as a non-destructive testing method of estimating the concrete strength at any time.

- C. Early-strength concrete can be used for any pavement, crosswalks, median noses, valley gutter, and curb and gutter as needed. Early-strength concrete shall achieve sufficient strength to be opened to traffic within three days of placement, or earlier if the compressive strength of 3000 psi is achieved. Because of the accelerated rate of hardening of early-strength concrete, the Contractor shall take such extra precautions as necessary to ensure satisfactory finishing of early strength concrete.
- D. The Contractor shall place the maturity-measuring device in the final 15 feet of concrete placed, which will control the opening time for all the concrete placed that day. For concrete pavement, the maturity device shall be located on the outside edge of the slab, at least 1 foot and not more than 2 feet from the edge.
- E. The Contractor shall develop maturity relationships for each mix design in accordance with ASTM C 1074 with the following additions or modifications:
 - 1. The cylinders used to establish the strength vs. maturity relationship shall be cast and cured in the field in conditions similar to the project.
 - 2. These specimens shall be tested at 1, 2, 3, 5, 7, and 14 days.
 - 3. Testing to determine datum temperature will not be required.
- F. The Contractor shall provide the maturity-measuring devices, probes, meters, and all necessary wires and connectors. The Contractor shall be responsible for the placement, protection, and maintenance of the maturity devices, wires, and meters. The equipment will be the property of the Contractor. The cost will be paid under "Maturity Testing for Compressive Strength."

PART 5. PRE-POUR MEETING

5.1 Pre-Pour Meeting for Concrete Pours > 500 cubic yards

Guidelines for a concrete pre-placement meeting are only required for each concrete pour greater than 500 cubic yards of concrete. The Contractor is responsible for taking minutes at the pre-placement meeting and distributing to all parties who attended the meeting.

A. Project Participants

1. Owner

a. Contact Name:_____Contact Number:_____

2. Engineer

3. Contact Name:_____Contact Number:_____

4. General Contractor

a. Contact Name:_____Contact Number:_____

5. Concrete Contractor

a. Contact Name:_____Contact Number:_____

6. Concrete Producer

a. Contact Name:_____Contact Number:_____

7. Testing Firm

a. Contact Name:_____Contact Number:_____

B. Grading and Base

1. Base material type and source

2. Compaction method to be used

3. Are separate procedures for backfilling trenches in the grade specified?

4. Party responsible for approving final grade and elevation

a. Contact Name:_____Contact Number:_____

b. Amount of advance notice needed to schedule inspection

5. Plan to protect finished grade from weather and vehicle traffic

6. Approximate completion date of base preparation

C. Proposed Concrete Pour Schedule

1. Number of pours and pour size
2. Approximate dates for pours
3. Is there a noise variance? What time can work start in the morning?
4. Has the concrete Contractor notified the concrete producer and discussed the pour schedule?

D. Concrete Mix and Concrete Production

1. Have concrete mix designs been submitted and approved?
 - a. What are the sources of the coarse and fine aggregate?
 - b. Do they meet the aggregate quality requirements?
 - c. Does the project require enhanced coarse aggregate quality?
 - d. Does the fine aggregate require mitigation?
2. Will high early mixes be needed? Have they been submitted and approved?

3. Mix Name	Use	Spec'd Air	Spec'd Slump	Spec'd Strength
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

4. Are there exterior concrete mixes approved for the project?
 - a. Are the water-to-cementitious ratios 0.45 or below?
 - b. Are the mixes air entrained?
5. Do the specifications allow the addition of water and/or admixtures to concrete on site?
6. Primary concrete batch plant location
7. Producer batch plant/quality control contact information
 - a. Contact Name:_____Contact Number:_____
8. Travel time to job site
9. Back-up batch plant location and contact information

10. Will batch tickets be printed for loads of concrete delivered to job site?

11. Who is responsible for saving batch tickets for the project records?

E. Concrete Field Testing

1. Engineer Party responsible for testing

a. Contact Name:_____Contact Number:_____

2. Contractor Party responsible for testing

a. Contact Name:_____Contact Number:_____

3. Advance notice needed to schedule on-site testing

4. Frequency of testing

a. Plastic concrete

b. Hardened concrete

5. Cylinder storage and handling

a. What is the procedure for protecting cylinders on site?

b. Who is responsible for providing the concrete test cylinder curing environment?

6. Has the concrete producer been added to the distribution list for test results?

7. What criteria will be used to address concrete that doesn't meet plastic concrete specifications? Who is responsible for acceptance of the concrete?

a. Contact Name:_____Contact Number:_____

F. Concrete Placement

1. Proposed placement sequence

a. Equipment to be used for each placement

b. Are there any special pours or unusual conditions on site?

2. Joints

a. What is the saw cutting window?

b. What is the joint layout / spacing?

c. Are there special considerations for joints around embedded objects?

d. Are the joints to be sealed?

- i. Proposed joint sealant product
 - ii. Proposed joint sealant procedure
- 3. Dowels and reinforcement as required by the plans.
- 4. Inclement weather
 - a. Will supplies be on site in case of unexpected rain?
 - b. Hot weather plan
 - i. What is the hot weather plan?
 - ii. When will the hot weather plan be used?
 - c. Cold weather plan
 - i. What is the cold weather plan?
 - ii. When will the cold weather plan be used?
- 5. Curing plan
 - a. Proposed curing product – is it MnDOT-approved?
 - b. Time frame to apply curing compound
 - c. Application rate
 - d. Proposed curing equipment
- 6. Party responsible for allowing concrete to be opened to any type of traffic:
 - a. Contact Name:_____Contact Number:_____
 - b. Is the Contractor using the Maturity Method for Strength Development?

SPECIFICATIONS
FOR
EROSION AND SEDIMENT CONTROL
CITY OF MAPLE GROVE, MINNESOTA
TABLE OF CONTENTS
January 2016

TABLE OF CONTENTS	PAGE #
SECTION 1 - GENERAL.....	1
SECTION 2 - SILT FENCE	1
SECTION 3 - INLET PROTECTION	1
SECTION 4 - STABILIZED CONSTRUCTION EXIT.....	5
SECTION 5 - STREET SWEEPING	5
SECTION 6 - SURFACE ROUGHENING	5
SECTION 7 - SITE REQUIREMENTS.....	7
SECTION 8 - SEDIMENT CONTROL PRACTICES	9
SECTION 9 - TEMPORARY SEDIMENT BASINS.....	11
SECTION 10 - DEWATERING AND BASIN DRAINING	13
SECTION 11 - INSPECTIONS AND MAINTENANCE.....	13
SECTION 12 - POLLUTION MANAGEMENT MEASURES/CONSTRUCTION SITE WASTE CONTROL	15
SECTION 13 - FINAL STABILIZATION	16
SECTION 14 - ENFORCEMENT	17
SECTION 15 - MEASUREMENT AND PAYMENT	19

- this page left intentionally blank -

**SPECIFICATIONS
FOR
EROSION AND SEDIMENT CONTROL**

CITY OF MAPLE GROVE, MINNESOTA

1. GENERAL

All storm water management/erosion control measures and controlling erosion/establishing vegetation measures shall be in accordance with MnDOT 2573 and 2575, respectively, Erosion Control Plans and Specifications, Storm Water Pollution Prevention Plan and any applicable permit requirements.

2. SILT FENCE

Silt fence shall be of the type and kind as indicated in the Contract and shall be constructed in accordance with MnDOT 3886 and City Standard Plates. Silt fence shall be installed on the contour (vs. up and down a hill) and constructed so that flow cannot bypass the ends (J-hook) Standard Plate Eros-3. Continuous silt fence segments shall not exceed 600-ft. All silt fence shall be inspected and maintained to preserve its effectiveness in accordance with the requirements of the Storm Water Pollution Prevention Plan. No additional compensation shall be made for repairs.

3. INLET PROTECTION

Storm drain inlet protection shall be done in accordance with the applicable MnDOT Standard Specifications and the following:

Storm drain inlet protection shall consist of the Best Management Practices and devices for preventing sedimentation from entering the underground drainage systems. Storm drain inlet protection applies to manholes, catch basins, curb inlets, and other drop type inlets constructed for the ingress of surface water runoff into underground drainage systems. Storm drain inlet protection as described in this Special Provision does not include practices to protect culverts.

The Contractor must protect all storm drain inlets with sediment capture devices prior to soil disturbing activities that may result in sediment laden storm water runoff entering the inlet. The Contractor shall provide effective storm drain inlet protection over the life of the Contract until all

surfaces with potential for discharging sediment to an inlet have been paved or stabilized. As the Contractor's operations change, the storm drain inlet Best Management Practice for sediment control must be modified by the Contractor to ensure proper effectiveness for sediment capture.

The Contractor is responsible for preventing or minimizing the potential for unsafe conditions, flooding, or siltation problems. For example, devices must be regularly cleaned out and emergency overflow must be an integral part of the device to reduce the flooding potential; and devices must be placed such that driving hazards or obstructions are not created.

The Contractor shall clean, remove sediment, or replace storm drain inlet protection devices on a routine basis such that the devices are fully functional for the next rainstorm event. Removal and disposal of trapped sediment in inlet protection devices shall be incidental to the Project. Sediment deposited in and/or plugging drainage systems is the responsibility of the Contractor and shall be removed at no expense to the Owner

a. MATERIALS

i. ROCK LOG

All aggregate shall be washed before placed in a rock bag. Rock shall be supplied in accordance with MnDOT 3137.2 Class D with a gradation in accordance with Table 3137-4 CA-00 through CA-50. The casing material for the rock shall be between 1.22 m and 3 m [4 feet and 10 feet] in length and between 100 mm [4 inches] and 150 mm [6 inches] in diameter when filled with rock. The casing material shall have a minimum grab tensile strength of 60 kg [130 pounds] and a minimum Mullen Burst Strength of 1200 kPa [175 psi].

ii. COMPOST LOG

Shall consist of a blend of 30-40% weed free compost as per MnDOT 3890 Grade 2 and 60-70% partially decomposed wood chips. The compost/wood blend material shall pass a 50 mm [2 inch] sieve with a minimum of 70% retained on the 10 mm [3/8 inch] sieve, in accordance with TMECC 02.02-B, "Sample Sieving for Aggregate Size Classification. The

compost/wood chip blend shall be pneumatically shot into a geotextile cylindrical bag. The geotextile bag shall consist of a knitted material with openings of 10 mm [3/8 inch] and contain the compost/wood chip material while not limiting water infiltration. The encased compost shall form a cylindrical log that is a maximum of 55 m [180 feet] and approximately 200 mm [8 inches] in diameter.

iii. SEDIMENT CONTROL INLET HAT

Sediment control inlet hats shall be a polyethylene hat-like structure covering the inlet with small weep holes on the side providing a filtering function of the storm water runoff and a large opening above the weep holes for emergency overflow.

iv. SILT FENCE RING AND ROCK LOG OR ROCK FILTER BERM COMBINATION

Silt fence shall meet the requirements of MnDOT 3886 Type Hand Installed (HI). Silt fence shall be placed in a circular configuration around the inlet to form a minimum 1.5 m [5 feet] diameter zone of protection. Rock logs, as described above, shall line the outside toe of the silt fence. Rock Filter berms shall consist of 3882 Type 9 Mulch.

v. POP-UP HEAD

Pop-up head inlet protection shall form a solid steel plate over the inlet casting or solid steel box that fits inside a grate assembly with the exception of a center cylindrical drain tube riser. The tube riser shall be fully extended when providing drainage functions and have holes that provide filtering capabilities. The tube riser shall be covered with a removable knit type geotextile that provides additional sediment filtering capabilities. The tube riser shall be able to be pushed down flat to the steel plate to allow construction vehicles to drive over it, facilitate cleanout, or to shut off drainage to the inlet.

vi. FILTER BAG INSERT

Filter bag with Frame inserts shall consist of a replaceable reinforced filter bag suspended from a retainer ring, or frame

that fits within a grate frame. The filter bag shall be constructed of a polypropylene filter geotextile fabric with a minimum weight of 222 g/m² [4 ounces per square yard], a minimum flow rate of 5908 L/minute/m² [145 gallons per minute per square foot], a minimum permittivity of 2 per second, and designed for a minimum silt and debris capacity of 0.57 m³ [2 square foot]. The filter bag shall be reinforced with an outer polyester mesh fabric with a minimum weight of 222 g/m² [4 ounces per square yard]. The filter bag shall be suspended from a galvanized steel ring or frame, conforming to ASTM-A36 utilizing a stainless steel band and locking clamp. The frame shall be designed with an overflow feature to prevent any ponding between scheduled cleanings and replacement of the filter bag. Overflow capacity shall be at a minimum equal to the design flow capacity of the structure's grate opening.

vii. Wimco

The Road Drain-Curb & Gutter model consists of a reusable, open topped receptacle that sets inside the storm sewer grate. An incorporated rear deflector plate is connected to the receptacle directing the water into the basin for filtration.

viii. OTHER

Devices approved by the Department's Erosion Control Engineering Unit and on file on the web under the Materials Engineering Section's Approved Products List can be furnished as meeting this specification requirement

The Contractor shall clean, remove sediment or replace control devices upon completion of the Contract work unless otherwise specified in the Contract or directed by the Engineer. All removed materials become the property of the Contractor.

The Contractor shall spread accumulated sediment to form a suitable surface for turf establishment or dispose of the sediment off of the Right of Way in accordance with MnDOT 2104.3D. The Contractor shall shape the area to permit

natural drainage. All work shall be done to the satisfaction of the Engineer.

4. STABILIZED CONSTRUCTION EXIT

The rock used for gravel pads should be 3-inch size such as MnDOT CA-15 or CA-25 coarse aggregate. The aggregate should be placed in a layer at least 6 inches thick.

The rock entrance should be at least 75 feet long; however, longer entrances may be required to achieve adequate cleaning.

A filter fabric may be needed under the rock to prevent migration of mud from the underlying soil into the stone.

5. STREET SWEEPING

Tracking of dirt onto public roads during hauling and general day-to-day construction operations will require periodic cleaning of these roadways. Scraping and vacuum assisted sweeping or a combination may be required. Power brooms or "sidewinder" type devices are not acceptable for cleaning of the roadway.

For the duration of the project, a gravel construction entrance shall be maintained at the entrance/exit to adjacent roadways to minimize the tracking of dirt outside of the project limits. The gravel shall be obtained from the existing roadway base/bituminous reclamation areas. The length of the gravel construction entrance shall be a minimum of 50-ft for the full width of the roadway.

Any sediment tracked onto City streets or onto streets that drain into storm sewer systems shall be kept clean by the Contractor; sediment shall be removed within 12 hours of verbal or written notification. If the Contractor fails to remove all of the tracked sediment from streets the Owner shall remove any sediment at the Contractor's expense.

6. SURFACE ROUGHENING

a. CUT SLOPE APPLICATIONS FOR AREAS WHICH WILL NOT BE MOWED

Cut slopes with a gradient steeper than 4:1 shall be stair-step graded or grooved.

Stair-step grading may be carried out on any material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.

The ratio of the vertical cut distance to the horizontal distance shall be less than 1:1 and the horizontal portion of the "step" shall slope toward the vertical wall.

Individual vertical cuts shall not be more than 30 inches on soft soil materials and not more than 40 inches in rock materials.

Grooving consists of using machinery to create a series of ridges and depressions which run perpendicular to the slope (on the contour). Grooves may be made with any appropriate implement which can be safely operated on the slope and which will not cause undue compaction. Suggested implements include discs, fillers, spring harrows, and the teeth on a front-end loader bucket. Such grooves shall not be less than 3 inches deep nor further than 15 inches apart.

b. CUTS, FILLS, AND GRADED AREAS WHICH WILL BE MOWED

Mowed slopes should not be steeper than 4:1. Excessive roughness is undesirable where mowing is planned.

These areas may be roughened with shallow grooves such as remain after tilling, disking, harrowing, raking, or use of a cultipacker-seeder. The final pass of any such tillage implement shall be on the contour (perpendicular to the slope.)

Grooves formed by such implements shall be not less than one inch deep and not further than 12 inches apart.

Fill slopes which are left rough as constructed may be smoothed with a dragline or pick-chain to facilitate mowing.

If at any point the contractor is unable to produce a 4:1 slope he may need to install a retaining wall at this location with no extra compensation. It will be the contractor's reasonability to minimize any retaining walls on the project.

c. ROUGHENING WITH TRACKED MACHINERY

Roughening with tracked machinery on clayey soils is not recommended unless no alternatives are available. Undue compaction of surface soil results from this practice. Sandy soils do not compact severely, and may be tracked. In no case is tracking as effective as the other roughening methods described.

When tracking is the chosen surface roughening technique, it shall be done by operating tracked machinery up and down the slope to leave horizontal depressions in the soil. As few passes of the machinery should be made as possible to minimize compaction.

d. SEEDING

Roughened areas shall be seeded and mulched as soon as possible to obtain optimum seed germination and seedling growth.

7. SITE REQUIREMENTS

- a. The Contractor must plan for and implement appropriate construction phasing vegetative buffer strips, horizontal slope grading, and other construction practices to minimize erosion. All areas not to be disturbed shall be marked (e.g. with flags, stakes, signs, silt fence etc.) on the project site before any work begins.
- b. All exposed soil areas must be stabilized as soon as possible to limit soil erosion but in no case later than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased and no later than seven (7) days after construction activity in that portion of the site has temporarily or permanently ceased when discharge points on the project is within one mile of a special or impaired water and flows to that special or impaired water.
- c. All slopes greater than a 4:1 will require a retaining wall until the contractor is able to produce a 4:1 slope and be acceptable by the Owner.
- d. Additional BMPs together with enhanced runoff controls are required for discharges to special waters and impaired waters. The BMPs identified for each special or impaired water are required for those areas of the

project draining to a discharge point on the project that is within one mile of a special or impaired water and flows to that water. The additional BMPs are identified in Appendix A of the NPDES Construction General Permit.

- e. The Contractor must stabilize the normal wetted perimeter of any temporary or permanent drainage ditch or swale that drains water from any portion of the construction site, or diverts water around the site, within 200 lineal feet from the property edge, or from the point of discharge into any surface water. Stabilization of the last 200 lineal feet must be completed within 24-hours after connecting to a surface water or property edge.
- f. Pipe outlets must have temporary or permanent energy dissipation before connecting to surface water.
- g. When possible, all slopes must be graded in such a fashion so that tracking marks made from heavy equipment are perpendicular to the slope.
- h. All areas disturbed during construction must be restored as detailed in these requirements. The type of permanent restoration shall be clearly shown on the plans including but not limited to sod, seed, impervious cover and structures. A minimum of 6 inches of topsoil must be installed prior to permanent restoration. Areas in which the topsoil has been placed and finish graded or areas that have been disturbed and other grading or site building construction operations are not actively underway must be temporary or permanently restored as set forth in the following requirements:
 - i. Areas with slopes that are less than 4:1 must be seeded and mulched within 14 days of the area not being actively worked.
 - ii. Areas with slopes that are greater or equal to 4:1 must be seeded and erosion control blanket placed within 14 days of the area not being actively worked.
 - iii. All seeded area must be either mulched and disc anchored, hydro-mulched, or covered by erosion control blanket to reduced erosion and protects the seed.

- iv. Temporary or permanent mulch must be disc anchored and applied at a uniform rate of 2 tons per acre and have 90% coverage.
 - v. If the disturbed area will be re-disturbed within a six month period, temporary vegetative cover shall be required consisting of an approved seed mixture and application rate.
 - vi. If the disturbed area will not be re-disturbed within a six month period, permanent vegetative cover shall be required consisting of an approved seed mixture and application rate.
 - vii. All areas that will not have maintenance done such as mowing as part of the final design shall be permanently restored using an approved seed mixture and application rate.
 - viii. Restoration of disturbed wetland areas shall be accomplished using an approved seed mixture and application rate.
-
- i. All erosion control measures must be maintained for the duration of the project until final stabilization has been achieved. If construction operations or natural events damage or interfere with any erosion control measures, they shall be restored to serve their intended function.
 - j. Additional erosion control measures shall be added as necessary to effectively protect the natural resources of the Owner. The temporary and permanent erosion control plans shall be revised as needed based on current site conditions and to comply with all applicable requirements.

8. SEDIMENT CONTROL PRACTICES

- a. Sediment control practices must be established on all down gradient perimeters before any up-gradient land disturbing activities begin. These practices must remain in place until final stabilization has been achieved.
- b. If down gradient treatment system is overloaded additional up gradient sediment control practices must be installed to eliminate overloading. The SWPPP must be amended to identify the additional practices.
- c. All storm drain inlets must be protected by approved BMPs during

construction until all potential sources for discharge have been stabilized. These devices must be maintained until final stabilization is achieved. Inlet protection may be removed if a specific safety concern (street flooding/freezing) has been identified.

- d. Temporary stockpiles must have silt fence or other effective sediment controls on the down gradient side of the stockpile and shall not be placed at least 25 feet from any road, wetland, protected water, drainage channel, or stormwater inlets. Stockpile left for more than 14 days must be stabilized with mulch, vegetation, tarps or other approved means.
- e. Vehicle tracking of sediment from project shall be minimized by approved BMPs. These shall be installed and maintained at the Owner approved entrances. Individual lots shall each be required to install and maintained entrances throughout the construction building until a paved driveway is install.
- f. Sediment that has washed or tracked from site by motor vehicles or equipment shall be cleaned from paved surfaces throughout the duration of construction. This work shall be considered incidental to the project.
- g. Silt fence or other approved sediment control devices must be installed in all areas as shown on the SWPPP and as directed by the Engineer.
- h. Silt fence or other approved sediment control devices shall be required along the entire curb line, except for approved opening where construction entrance will be installed or drainage flows away from curb. This device must be maintained until final stabilization is achieved. Ditch checks shall be required in ditch bottoms. Spacing for the check must be as followed: **[Height in feet (of the sediment device used)] X 100 / Slope Gradient**
- i. Dust control measures, such as application of water must be performed periodically due to weather, construction activity, and/or as directed

by the Owner.

- j. Flows from diversion channels or pipes (temporary or permanent) must be routed to sedimentation basins or appropriate energy dissipaters to prevent the transport of sediment to outflow or lateral conveyors and to prevent erosion and sediment buildup when runoff flows into the conveyors.
- k. All sediment control measures shall be used and maintained for the duration of the project until final. If construction operations or natural events damage or interfere with any erosion control measures, they must be restored to serve their intended function.
- l. Additional sediment control measures shall be added as necessary to effectively protect the natural resources of the Owner. The temporary and permanent erosion control plans shall be revised as needed based on current site conditions and to comply with all applicable requirements.

9. TEMPORARY SEDIMENT BASINS

A temporary sediment basin (or permanent) shall be provided when ten (10) or more acres of disturbed soil drain to a common location prior to the runoff leaving the site or entering surface waters. The Contractor is also encouraged, but not required to install temporary sediment basins in areas with steep slope or highly erodible soils even if the area is less than ten (10) acres and it drains to one common area. The basins shall be designed and constructed according to the following requirements:

- a. The basins must provide storage below the outlet pipe for a calculated volume of runoff from a 2-year, 24-hour storm from each acre drained to the basin, except that in no case shall the basin provide less than 1,800 cubic feet of storage below the outlet pipe from each acre drained to the basin.
- b. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage below

the outlet pipe per acre drained to the basin shall be provided where attainable until final stabilization of the site.

- c. Temporary basin outlets will be designed to prevent short-circuiting and the discharge of floating debris. The basin must be designed with the ability to allow complete basin drawdown (e.g., perforated riser pipe wrapped with filter fabric and covered with crushed gravel, pumps or other means) for maintenance activities, and provide a stabilized emergency overflow to prevent failure of pond integrity. Energy dissipation must be provided for the basin outlet.
- d. Temporary (or permanent) basins must be constructed and made operational concurrent with the start of soil disturbance that is up gradient of the area and contributes runoff to the pond.
- e. Where the temporary sediment basin is not attainable due to site limitations, equivalent sediment controls such as smaller sediment basins, and/or sediment traps, silt fences, vegetative buffer strips or any appropriate combination of measures are required for all down slope boundaries of the construction area and for those side slope boundaries deemed appropriate as dictated by individual site conditions. In determining whether installing a sediment basin is attainable, the Contractor must consider public safety and may consider factors such as site soils, slope, and available area on site. This determination must be documented in the SWPPP.
- f. The Contractor shall maintain the sedimentation basins and will remain functional until an acceptable vegetative cover is restored to the site, resulting in a pre-development level rate of erosion. The city will not issue building permits for lots containing sediment basins until they have been removed or relocated based on the projects restoration progress.
- g. Basins designed to be used for permanent stormwater management shall be brought back to their original design contours prior to acceptance by the Owner.

10. DEWATERING AND BASIN DRAINING

- a. If water cannot be discharged into a sedimentation basin before entering a surface water it must be treated with the appropriate BMPs, such that the discharge does not adversely affect the receiving water or downstream landowners. The Contractor must make sure discharge points are appropriately protected from erosion and scour. The discharge must be dispersed over riprap, sand bags, plastic sheeting or other acceptable energy dissipation measures. Adequate sediment control measures are required for discharging water that contains suspended soils.
- b. All water from dewatering or basin draining must discharge in a manner that does not cause nuisance conditions, erosion in receiving channels, on down slope properties, or inundation in wetlands causing significant adverse impact to wetlands.

11. INSPECTIONS AND MAINTENANCE

- a. The Contractor shall be responsible for inspecting and maintenance of the BMPs.
- b. The Contractor must routinely inspect the construction project once every seven (7) days during active construction and within 24-hours of a rainfall event of 0.5 inches or greater in 24-hours.
- c. All inspections and maintenance conducted during construction must be recorded in writing and must be retained with the SWPPP. Records of each inspection and maintenance activity shall include:
 - i. Date and time of inspection.
 - ii. Name of person(s) conducting the inspections.
 - iii. Findings of inspections, including recommendations for corrective actions.
 - iv. Corrective actions taken (including dates, times, and the party completing the maintenance activities).
 - v. Date and amount of all rainfall events 0.5 inches or greater in 24-hours.
 - vi. Documentation of changes made to SWPPP.

- d. Parts of the construction site that have achieved final stabilization, but work continues on other parts of the site, inspections of the stabilized areas can be reduced to once a month. If work has been suspended due to frozen ground conditions, the required inspections and maintenance must take place as soon as runoff occurs or prior to resuming construction, whichever happens first.
- e. All erosion and sediment BMPs shall be inspected to ensure integrity and effectiveness. All nonfunctional BMPs shall be repaired, replaced or supplemented with a functional BMP. The Contractor shall investigate and comply with the following inspection and maintenance requirements.
- f. All silt fences must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/2 of the height of the fence. These repairs shall be made within 24-hours of discovery, or as soon as field conditions allow access.
- g. Temporary and permanent sedimentation basins must be drained and the sediment removed when the depth of sediment collected in the basin reaches 1/2 the storage volume. Drainage and removal must be completed within 72-hours of discovery, or as soon as field conditions allow access.
- h. Surface waters, including drainage ditches and conveyance systems, must be inspected for evidence of sediment being deposited by erosion. The Contractor shall remove all deltas and sediment deposited in surface waters, including drainage ways, catch basins, and other drainage systems, and re-stabilize the areas where sediment removal results in exposed soil. The removal and stabilization shall take place within seven (7) days of discovery unless precluded by legal, regulatory, or physical access constraints. The Contractor shall use all reasonable efforts to obtain access. If precluded, removal and stabilization shall take place within seven (7) calendar days of obtaining access. The Contractor is responsible for contacting all local, regional, state and federal authorities and receiving any applicable permits, prior to conducting any work.

- i. Construction site vehicle exit locations shall be inspected for evidence of off-site sediment tracking onto paved surfaces. Tracked sediment shall be removed from all off-site paved surfaces, within 24-hours of discovery, or if applicable, within a shorter time.
- j. The Contractor is responsible for the operation and maintenance of temporary and permanent water quality management BMPs, as well as all erosion prevention and sediment control BMPs, for the duration of the construction work at the site. The Contractor is responsible until another Contractor has assumed control over all areas of the site that have not been finally stabilized or the site has undergone final stabilization, and a NOT has been submitted to the MPCA.
- k. If sediment escapes the construction site, off-site accumulations of sediment shall be removed in a manner and at a frequency sufficient to minimize off-site impacts (e.g., fugitive sediment in streets could be washed into storm sewers by the next rain and/or pose a safety hazard to users of public streets).
- l. All infiltration areas shall be inspected to ensure that no sediment from ongoing construction activities is reaching the infiltration area and these areas are protected from compaction due to construction equipment driving across the infiltration area.

12. POLLUTION MANAGEMENT MEASURES/CONSTRUCTION SITE WASTE CONTROL

- a. The Contractor must implement the following pollution prevention management measures on the site:
 - i. Solid Waste – Collected sediment, asphalt and concrete millings, floating debris, paper, plastic, fabric, construction and demolition debris and other wastes must be disposed of properly and must comply with MPCA disposal requirements.
 - ii. Hazardous Materials such as oil, gasoline, paint and any hazardous substances must be properly stored, including secondary containment, to prevent spills, leaks or other discharge. Restricted access to storage areas shall be provided to prevent vandalism. Storage and disposal of hazardous waste shall be in compliance with MPCA regulations.

- iii. External washing of trucks and other construction vehicles must be limited to a defined area of the site. Runoff shall be contained and waste properly disposed of. No engine degreasing is allowed on site.
- iv. The Owner prohibits discharges of any material other than stormwater, and discharges from dewatering or basin draining activities. Prohibited discharges include but are not limited to vehicle and equipment washing, maintenance spills, wash water, and discharges of oil and other hazardous substances.
- v. The Contractor must comply with all other pollution prevention/good housekeeping requirements of the MPCA NPDES Construction General Permit.

13. FINAL STABILIZATION

The Contractor must ensure final stabilization of the project. Final stabilization can be achieved in one of the following ways:

- a. All soil disturbing activities at the site have been completed and all soils will be stabilized by a uniform perennial vegetative cover with a density of at least 70 percent over the entire pervious surface area, or other equivalent means necessary to prevent soil failure under erosive conditions and;
 - i. All drainage ditches, constructed to drain water from the site after construction is complete, must be stabilized to preclude erosion; and
 - ii. All temporary synthetic, and structural erosion prevention and sediment control BMPs (such as silt fence) must be removed as part of the site final stabilization; and
 - iii. The Contractor must clean out all sediment from conveyances and from temporary sedimentation basins that are to be used as permanent water quality management basins. Sediment must be stabilized to prevent it from washing back into the basin, conveyances or drainage ways discharging off-site or to surface waters. The cleanout of permanent basins must be sufficient to return the basin to design capacity.

- b. For residential construction only, final stabilization has been achieved when:
 - i. Temporary erosion protection and down gradient perimeter control for individual lots has been completed and the residence has been transferred to the homeowner.

14. ENFORCEMENT

This section imposes the obligation of an applicant to perform their duties in an honest, diligent, and cooperative manner.

The following section describes the Owner's authority and the mechanisms for enforcing Permit provisions on construction sites within the boundaries of the Owner's MS4 jurisdiction.

a. Compliance Requirements

Compliance with stormwater permits and laws on construction projects within the Owner's MS4 must be enforced according to these Enforcement Response Procedures.

Applicants are to comply with the State's NPDES CGP, Owner, and Watershed permits for regulated construction projects, including the obligation to file a NOI and obtain authorization under the State CGP for each construction project or site. The applicant shall also file a NOT for each construction project or site, either terminating their responsibility if final stabilization has been achieved, or transferring it to another owner for completion.

b. Construction Enforcement

When stormwater BMP's are non-compliant and are identified by the Owner enforcement actions will be taken promptly but no later than 48 hours following identification of the non-compliance. The Owner will take appropriate sanctions against the applicant based on the nature and severity of the situation. Non-compliances will be classified as minor or major violation. Major violations are generally those acts or omissions that lead to a discharge of pollutants to stormwater. Minor violations are generally instances of non-compliance that do not directly result in such a discharge. Serious discharges or an imminent threat of discharge on a project may require an immediate escalation to a higher level of

enforcement. The level of enforcement response will depend upon several factors:

- i. Severity of the violation: the duration, quality, and quantity of pollutants, and effect on public safety and the environment.
- ii. The violator's knowledge (either negligent or intentional) of the regulations being violated.
- iii. A history of violations and /or enforcement actions individual or contractor.
- iv. The potential deterrent value of the enforcement action.

The Owner will use the following progressive enforcement policy, escalating the response when an applicant fails to respond in a timely manner. If the Owner identifies a deficiency in the implementation of the approved SWPPP or amendments and the deficiency is not corrected immediately or by a date requested by the Owner, the project is in non-compliance. The recommended sequence of enforcement actions are detailed below.

- i. Verbal Warning

This action is a verbal exchange between an inspector or the resident engineer and the Contractor. The information exchanged will be documented by the inspector. Typically, no letter is written if the problem is corrected immediately and the inspector or resident engineer observes the corrective action and deems it appropriate. If the violation is not addressed within the time frame specified, a \$1,000 per day fine may be assessed to the Contractor.

- ii. Written Warning

A warning letter may be issued if the non-compliance continues for 7 days after the verbal warning is issued, if the non-compliance cannot be corrected while the inspector is on site, or if the non-compliance is a significant violation. The warning letter will document the reasons why the discharge is illegal and provide deadline for compliance. Based on the type and severity of the non-compliance, the period between the verbal and written warnings may not wait the full 7 days. Compliance is required within 7 days to avoid additional enforcement actions; however, if the situation warrants, shorter or longer deadlines may be permissible.

iii. Stop Work Order

If the verbal and written warnings do not result in corrective action by the documented deadline, the Owner may stop work (full or partial shutdown) at the construction site. Upon successful corrective action in response to a stop work order and upon approval by the Owner, work may begin at the site.

iv. Temporary Suspension of Work

If immediate action is required due to an imminent threat of discharge or if the contractor does not respond to the warning letter within the required time frame, the Owner may temporarily suspend work on the project until the corrective action has been completed.

v. Require Corrective Action

The Owner may require the permit holder to undertake corrective or remedial action to address any release or threatened release or discharge of the hazardous substance, pollutant or contaminant, water, wastewater, or stormwater.

15. MEASUREMENT AND PAYMENT

Measurement and payment for the following items will be considered compensation in full for all work necessary to complete the preparation, installation, maintenance, sediment removal, repairs and removal of the installed item (if necessary) of the items specified in project manual.

a. Silt Fence

Measurement will be per lineal foot for the type specified in the proposal. Half of the quantity will be paid upon installation with the remaining half being paid upon removal.

b. Inlet Protection

Measurement will be per each inlet structure regardless of type unless separate bid items are provided. Half of the quantity will be paid upon installation with the remaining half being paid upon removal.

c. Stabilized Construction Exit

Measurement will be per each location as shown on the drawings or as approved by the Owner.

d. Temporary Seeding and Mulch

Temporary seeding and Mulching of the site and stockpiles will be considered incidental unless otherwise described in the special provisions.

e. Dust Control

Dust control shall be considered incidental unless a specific bid item is provided.

f. Bio Rolls

Measurement will be per lineal foot for the each type specified in the proposal.

g. Erosion Control Blanket

Measurement will be per square yard for the type specified in the proposal. Payment shall include topsoil, seed and fertilizer as specified.

h. Seeding

Measurement will be per acres seeded and shall include preparation of the surface and all incidental items associated with the work. Payment for seeding will not be made until 30 days after the seeding has taken place.

i. Mulch

Measurement will be per ton for each type specified in the proposal.

j. Seed and Fertilizer

Measurement will be per pound for each mix and type specified at the given rate (lbs/acre).

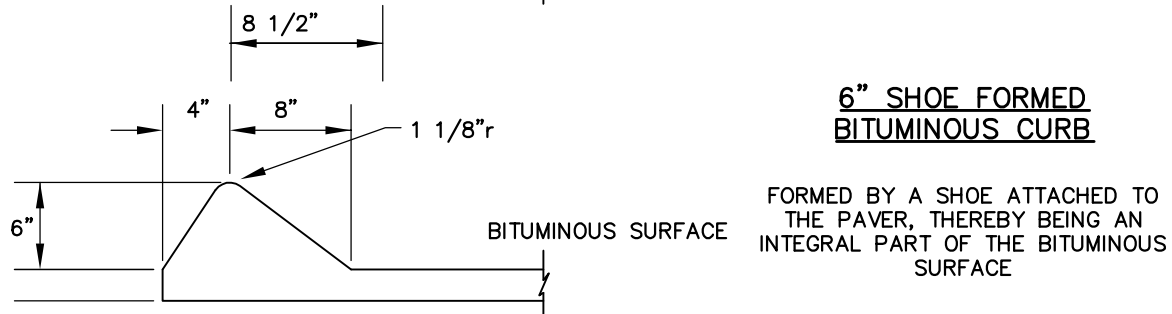
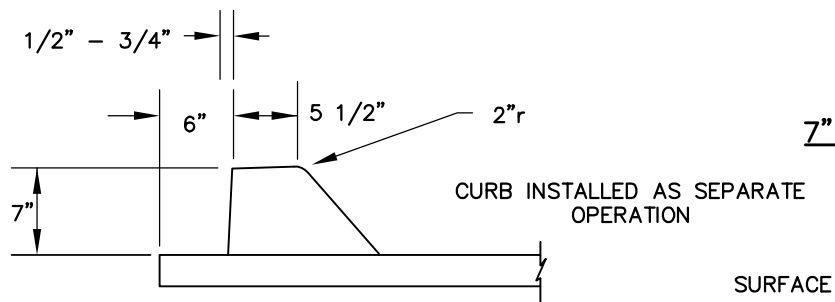
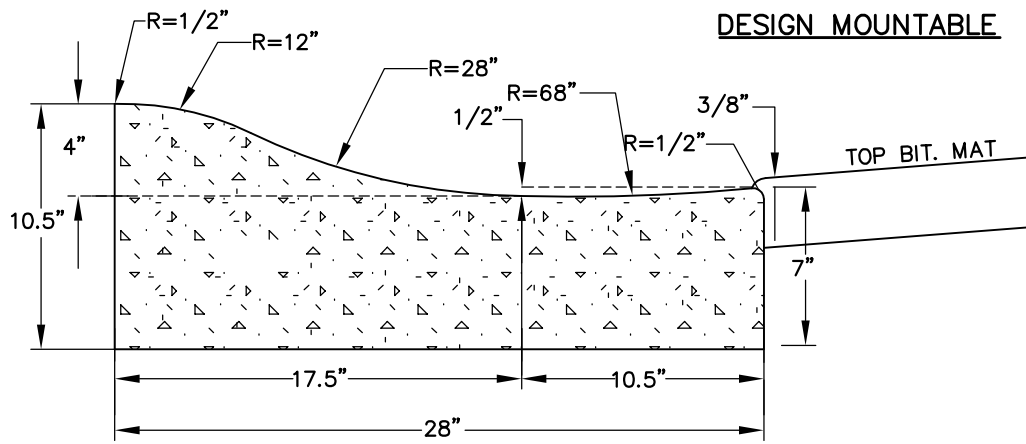
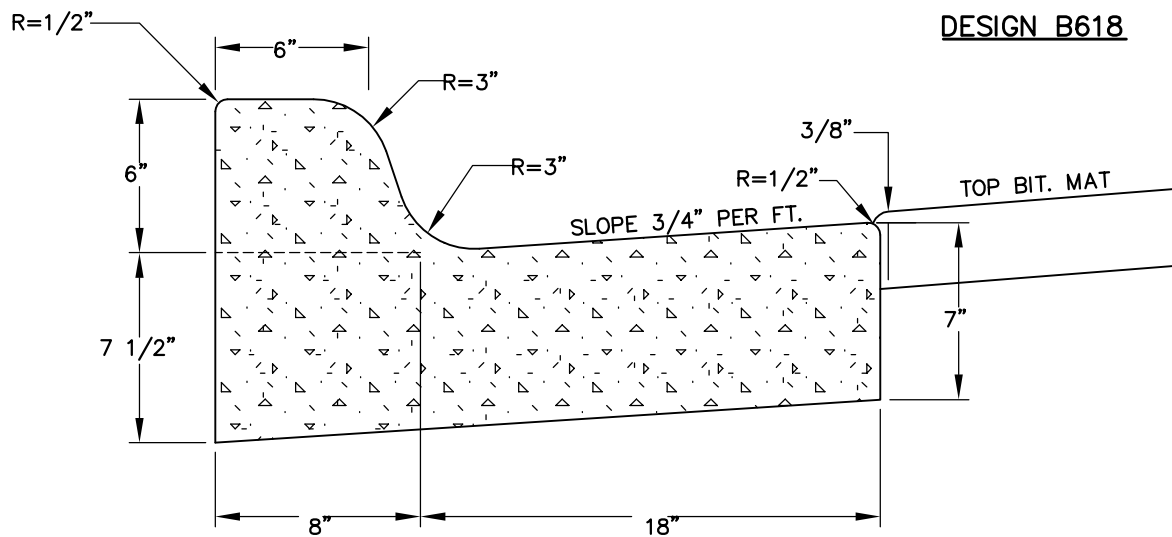
k. Sod

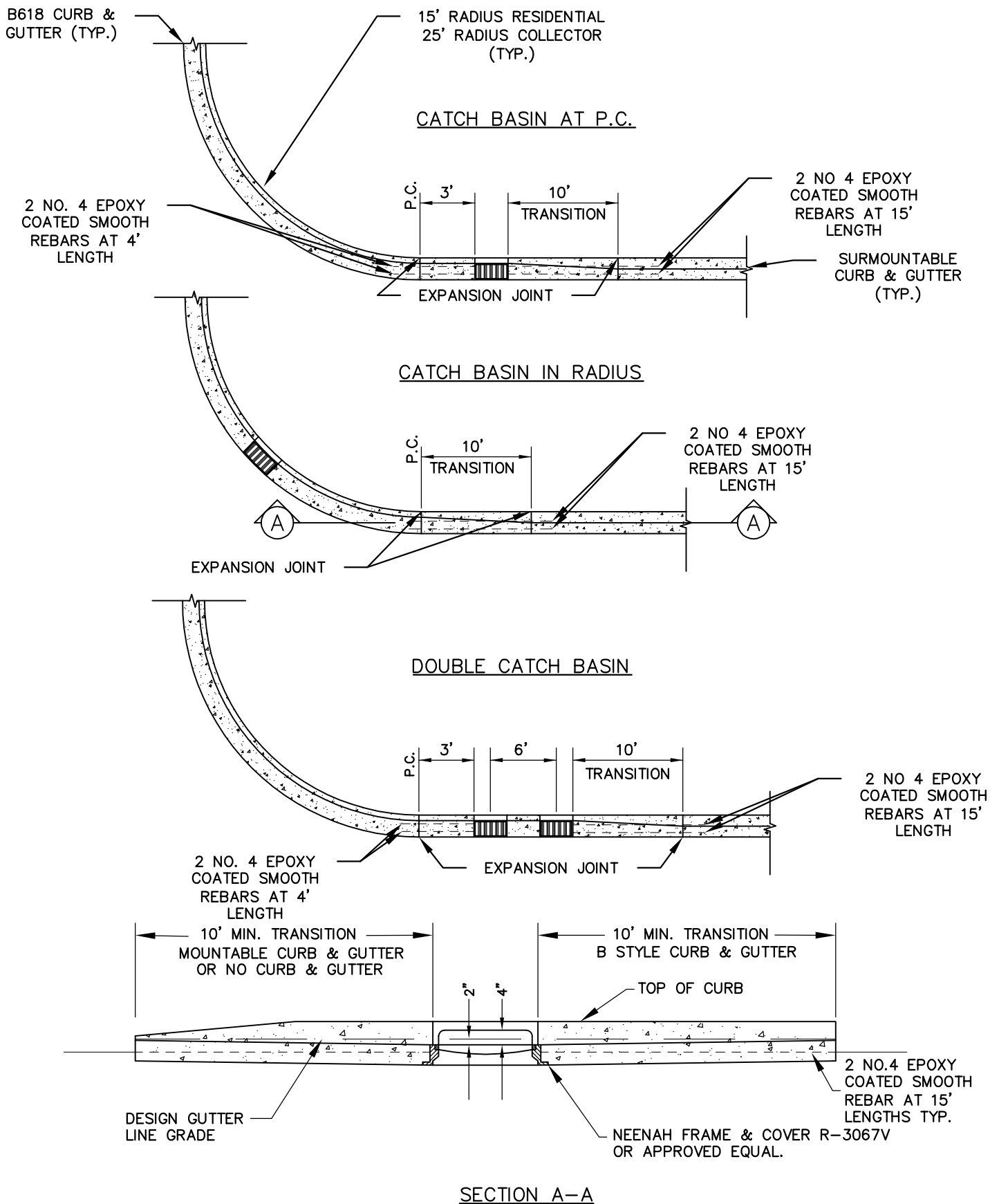
Measurement will be per square yard installed in place. Payment shall include furnishing and installing 6" of topsoil.

l. Street Sweeping

Measurement will be per hour for sweeping required prior to the installation of the bituminous wear course. All other sweeping throughout the project shall be considered incidental unless otherwise specified in the special provisions.

[END EROSION & SEDIMENT CONTROL]





NOTES:

EXPANSION JOINT MATERIAL SHALL BE CLOSED CELL POLYETHYLENE

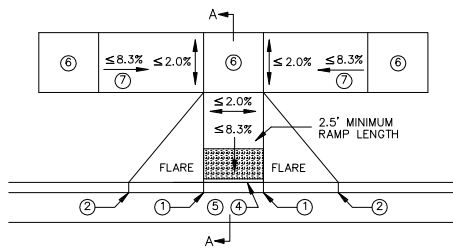


LAST REVISION
JANUARY 2016

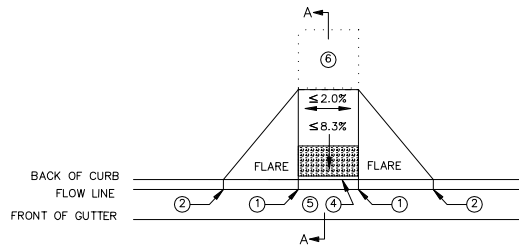
CURB RADIUS

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

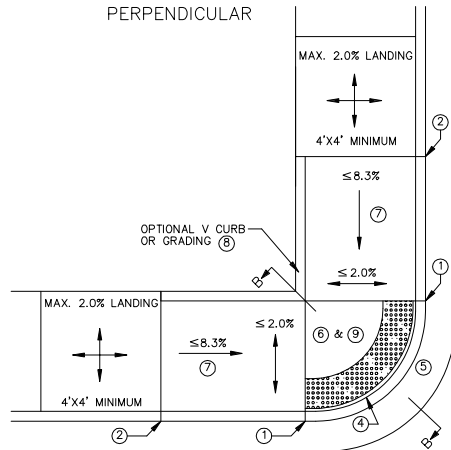
STANDARD
PLATE #
CONC-2



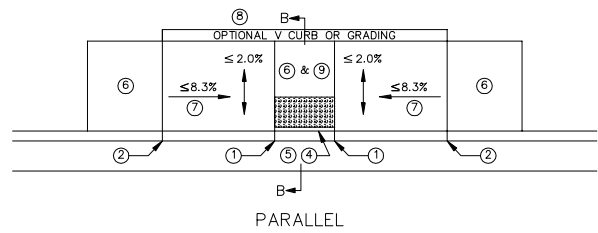
TIERED PERPENDICULAR



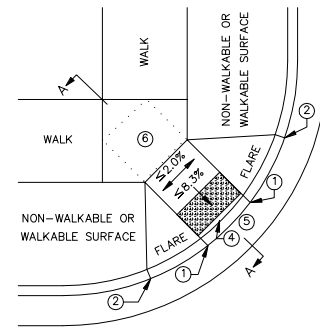
PERPENDICULAR



DEPRESSED CORNER

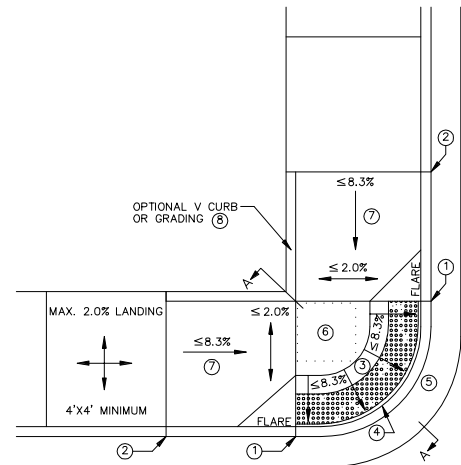


PARALLEL



DIAGONAL

(DIAGONAL RAMPS SHOULD ONLY BE USED AFTER ALL OTHER CURB RAMP TYPES HAVE BEEN CONSIDERED AND DEEMED IMPRACTICAL)



FAN

NOTES:

SLOPES ARE DEFINED AS ABSOLUTE ELEVATION DIFFERENCE PER LENGTH OF RUN. (AS OPPOSED TO A RELATIVE SLOPE WITH RESPECT TO A CURB LINE OR CURB HEIGHT.)

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE CHANGES DIRECTION, AND AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5%.

INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED EVERY 30' OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS 5% OR GREATER.

CONTRACTION JOINTS SHALL BE CONSTRUCTED AT ALL GRADE BREAKS. TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

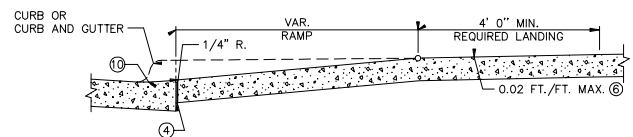
USE 6" CONCRETE FOR ALL RAMP AND LANDING AREAS.

CONTRACTOR SHALL EMPLOY APPROPRIATE METHODS FOR INTERMEDIATE GRADE CONTROL TO ENSURE ALL GRADE BREAKS ARE CONSTRUCTED PROPERLY.

ALL GRADE BREAKS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL/PEDESTRIAN ACCESS ROUTE.

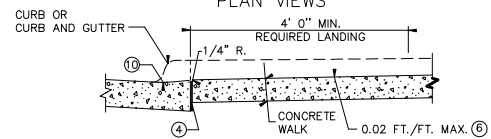
- ① 0" CURB HEIGHT.
- ② FULL CURB HEIGHT.
- ③ LESS THAN 5% PREFERRED. 5-8.3% SHOULD ONLY BE USED AFTER ALL OTHER SLOPES HAVE BEEN CONSIDERED AND DEEMED IMPRACTICAL.
- ④ 1/2" PREFORMED JOINT FILLER MATERIAL AASHTO M 213. JOINT FILLER SHALL BE PLACED FLUSH WITH THE BACK OF CURB AND ADJACENT SIDEWALK. JOINT SHALL BE FREE OF DEBRIS. DOMES SHALL BE SET BACK 3" FROM THE BACK OF CURB OR EDGE OF ROADWAY.
- ⑤ SEE PEDESTRIAN ACCESS ROUTE CURB AND GUTTER DETAIL FOR INFORMATION ON CONSTRUCTING CURB AND GUTTER AT CURB OPENINGS. SEE STANDARD PLATE CONC-5.
- ⑥ 4' BY 4' MIN. LANDING WITH MAX. 2% SLOPE IN ALL DIRECTIONS.
- ⑦ IF RUNNING SLOPE IS LESS THAN 5.0% NO UPPER LANDING IS REQUIRED.
- ⑧ V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN ROW ALLOWS.
- ⑨ DETECTABLE WARNINGS MAY BE PART OF 4' X 4' LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
- ⑩ ANY VERTICAL LIP THAT OCCURS AT THE FLOW LINE MAY NOT BE GREATER THAN 1/4 INCH. SEE STANDARD PLATE CONC-5

PERPENDICULAR/TIERED/DIAGONAL/FAN
PLAN VIEWS



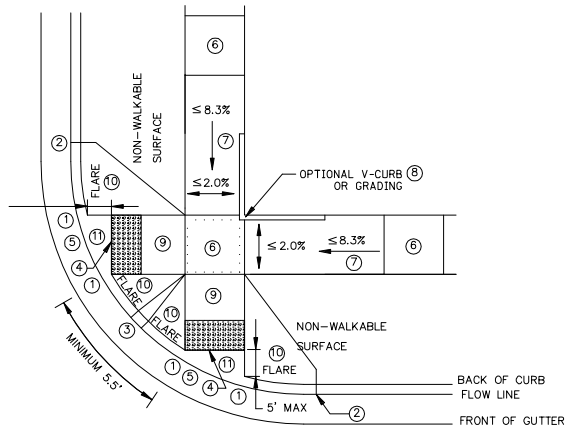
SECTION A-A

PARALLEL/DEPRESSED CORNER
PLAN VIEWS

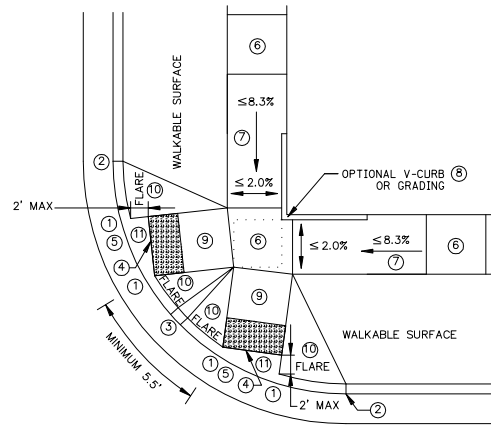


SECTION B-B

COMBINED DIRECTIONAL

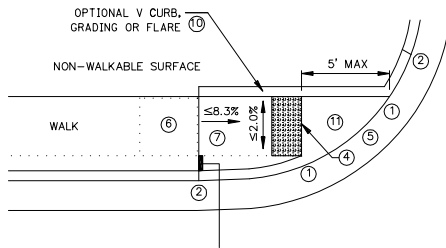


(ADJACENT TO NON-WALKABLE SURFACE)

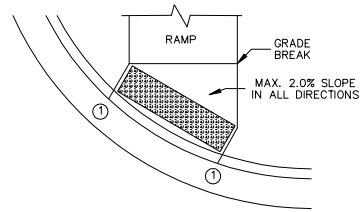


(ADJACENT TO WALKABLE SURFACE)

ONE-WAY DIRECTIONAL



IF NON-CONCRETE BLVD. IS CONSTRUCTED AND IS LESS THAN 2' IN WIDTH AT TOP OF CURB TRANSITION, PAVE CONCRETE RAMP WIDTH TO ADJACENT BACK OF CURB.



DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED

NOTES:

SLOPES ARE DEFINED AS ABSOLUTE ELEVATION DIFFERENCE PER LENGTH OF RUN. SLOPES ARE DEFINED AS ABSOLUTE ELEVATION DIFFERENCE PER LENGTH OF RUN.

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE CHANGES DIRECTION, AND AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5%.

INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS 5% OR GREATER.

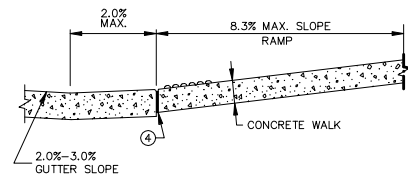
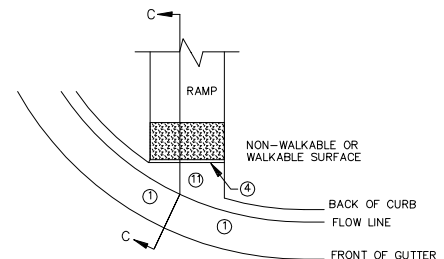
CONTRACTION JOINTS SHALL BE CONSTRUCTED AT ALL GRADE BREAKS. TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

USE 6" CONCRETE FOR ALL RAMP AND LANDING AREAS.

CONTRACTOR SHALL EMPLOY APPROPRIATE METHODS FOR INTERMEDIATE GRADE CONTROL TO ENSURE ALL GRADE BREAKS ARE CONSTRUCTED PROPERLY.

ALL GRADE BREAKS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL/PEDESTRIAN ACCESS ROUTE.

- ① 0" CURB HEIGHT.
- ② FULL CURB HEIGHT.
- ③ LESS THAN 5% PREFERRED. 5-8.3% SHOULD ONLY BE USED AFTER ALL OTHER SLOPES HAVE BEEN CONSIDERED AND DEEMED IMPRACTICAL.
- ④ 1/2" PREFORMED JOINT FILLER MATERIAL AASHTO M 213. JOINT FILLER SHALL BE PLACED FLUSH WITH THE BACK OF CURB AND ADJACENT SIDEWALK. JOINT SHALL BE FREE OF DEBRIS. DOMES SHALL BE SET BACK 3" FROM THE BACK OF CURB OR EDGE OF ROADWAY.
- ⑤ SEE PEDESTRIAN ACCESS ROUTE CURB AND GUTTER DETAIL FOR INFORMATION ON CONSTRUCTING CURB AND GUTTER AT CURB OPENINGS. SEE STANDARD PLATE CONC-5.
- ⑥ 4' BY 4' MIN. LANDING WITH MAX. 2% SLOPE IN ALL DIRECTIONS.
- ⑦ IF RUNNING SLOPE IS LESS THAN 5.0% NO UPPER LANDING IS REQUIRED.
- ⑧ V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN ROW ALLOWS.
- ⑨ DETECTABLE WARNINGS MAY BE PART OF 4' X 4' LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
- ⑩ ANY VERTICAL LIP THAT OCCURS AT THE FLOW LINE MAY NOT BE GREATER THAN 1/4 INCH.



SECTION C-C

CURB FOR DIRECTIONAL RAMPS

(TO BE USED FOR ALL DIRECTIONAL RAMPS)

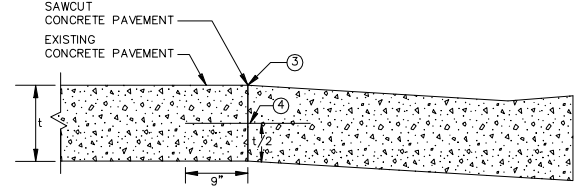
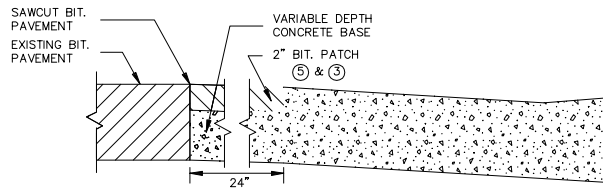
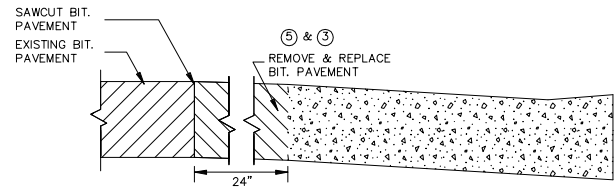
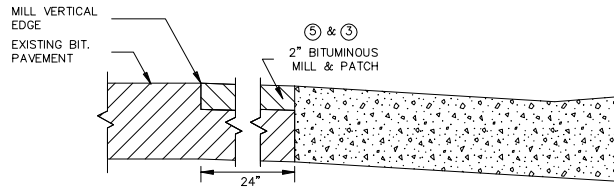


LAST REVISION
NOVEMBER 2014

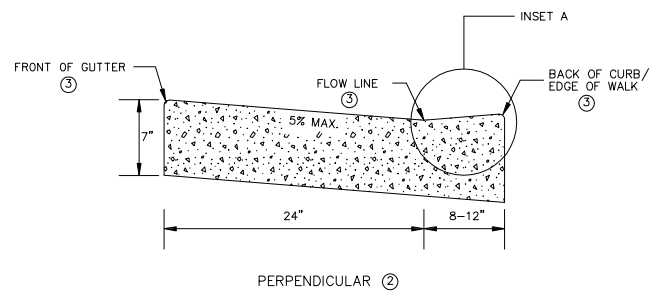
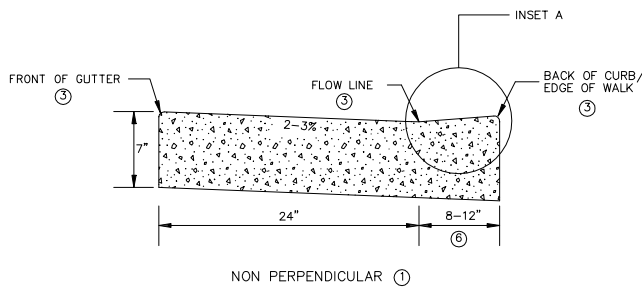
PEDESTRIAN CURB RAMP 2 OF 5

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
CONC-4



PAVEMENT TREATMENT OPTIONS
IN FRONT OF CURB & GUTTER
(USE ON CURB RAMP RETROFITS)



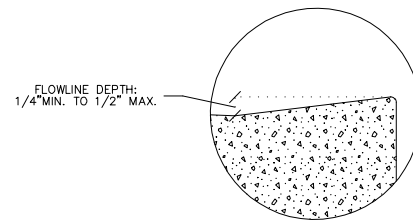
PEDESTRIAN ACCESS ROUTE
CURB & GUTTER DETAIL

NOTES:

ADEQUATE DRAINAGE SHALL BE MAINTAINED THROUGHOUT THE PEDESTRIAN ACCESS ROUTE (PAR) AT A 2% MAXIMUM.

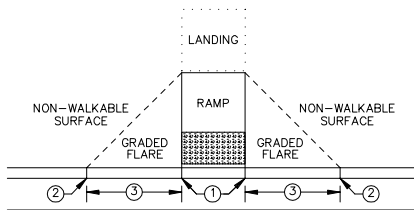
NO PONDING SHALL BE PRESENT IN THE PAR.

- ① FOR USE AT CURB CUTS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED NON PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: FANS, DEPRESSED CORNERS, & ONE WAY AND COMBINED DIRECTIONALS.
- ② FOR USE AT CURB CUTS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: PERPENDICULAR, PARALLEL AND DIAGONAL RAMPS.
- ③ THERE SHALL BE NO VERTICAL DISCONTINUITIES GREATER THAN 1/4".
- ④ DRILL AND GROUT NO. 4 EPOXY-COATED 18" LONG BARS AT 2' CENTER TO CENTER INTO EXISTING CONCRETE PAVEMENT.
- ⑤ ELEVATION CHANGE TAKES PLACE FROM THE EXISTING TO NEW FRONT OF GUTTER. PATCH IS USED TO MATCH THE NEW GUTTER FACE INTO THE EXISTING ROADWAY.
- ⑥ VARIABLE WIDTH FOR DIRECTIONAL CURB APPLICATIONS.

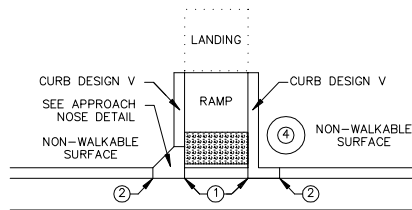


INSET A

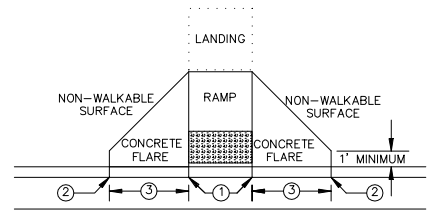
← DIRECTION OF TRAFFIC



GRADED FLARES



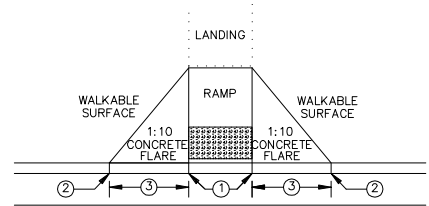
RETURNED CURB



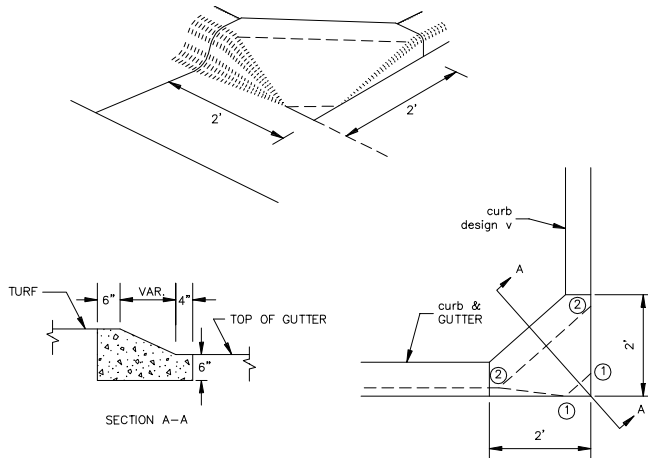
PAVED FLARES

TYPICAL SIDE TREATMENT OPTIONS

SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED ON ALL RAMPS AS FIELD CONDITIONS DICTATE. THE ENGINEER SHALL DETERMINE THE RAMP SIDE TREATMENTS BASED ON MAINTENANCE OF BOTH ROADWAY AND SIDEWALK, ADJACENT PROPERTY CONSIDERATIONS, AND MITIGATING CONSTRUCTION IMPACTS.

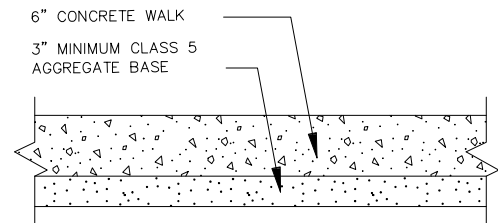


PAVED FLARES



APPROACH NOSE DETAIL
(to BE USED ON DOWNSTREAM SIDE OF TRAFFIC)

APPROACH NOSE PAID FOR AS 2' V CURB AND 2' CURB AND GUTTER.

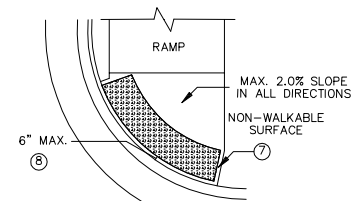


TYPICAL SIDEWALK SECTION AT QUADRANT

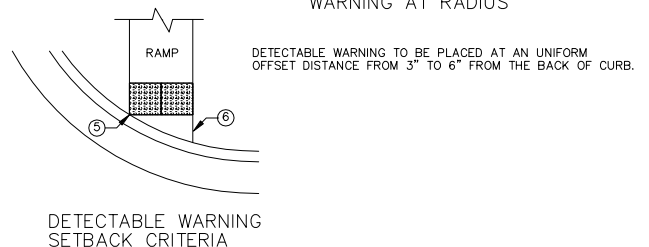
NOTES:

USE 6" CONCRETE WALK UP TO EXISTING SIDEWALK GRADES FOR ALL RAMP AND LANDING AREAS.
WHETHER A SURFACE IS WALKABLE OR NOT SHALL BE DETERMINED BY THE ENGINEER.
FLARE LENGTHS SHOULD BE LESS THAN 8' LONG MEASURED ALONG THE RAMPS FROM THE BACK OF CURB.

- ① 0" CURB HEIGHT.
- ② FULL CURB HEIGHT.
- ③ SHALL BE 1:10 WHEN ADJACENT TO WALKABLE SURFACES, A PAVED FLARE SHOULD BE 2' WHEN ADJACENT TO NON-WALKABLE SURFACES WHILE A GRADED FLARE SHOULD BE 1:6.
- ④ IMMOVABLE OBJECT OR OBSTRUCTION.
- ⑤ DETECTABLE WARNING SHALL HAVE ONE CORNER 3" FROM THE BACK OF CURB.
- ⑥ SHALL BE 2' MAXIMUM OFFSET WHEN ADJACENT TO WALKABLE SURFACE AND 5' MAXIMUM OFFSET WHEN ADJACENT TO NON-WALKABLE SURFACE.
- ⑦ WHEN NO FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
- ⑧ IF NO CURB AND GUTTER IS PLACED IN RURAL SECTIONS DETECTABLE WARNING SHOULD BE PLACED 1' FROM THE EDGE OF ROADWAY TO PROVIDE CONCRETE BORDER.



RADIAL DETECTABLE WARNING AT RADIUS



DETECTABLE WARNING SETBACK CRITERIA

DETECTABLE WARNING PLACEMENT

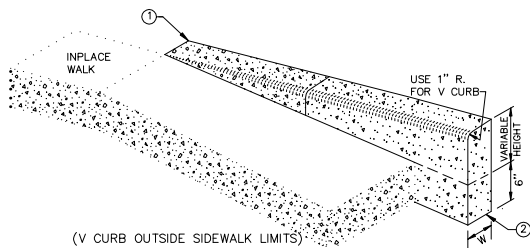
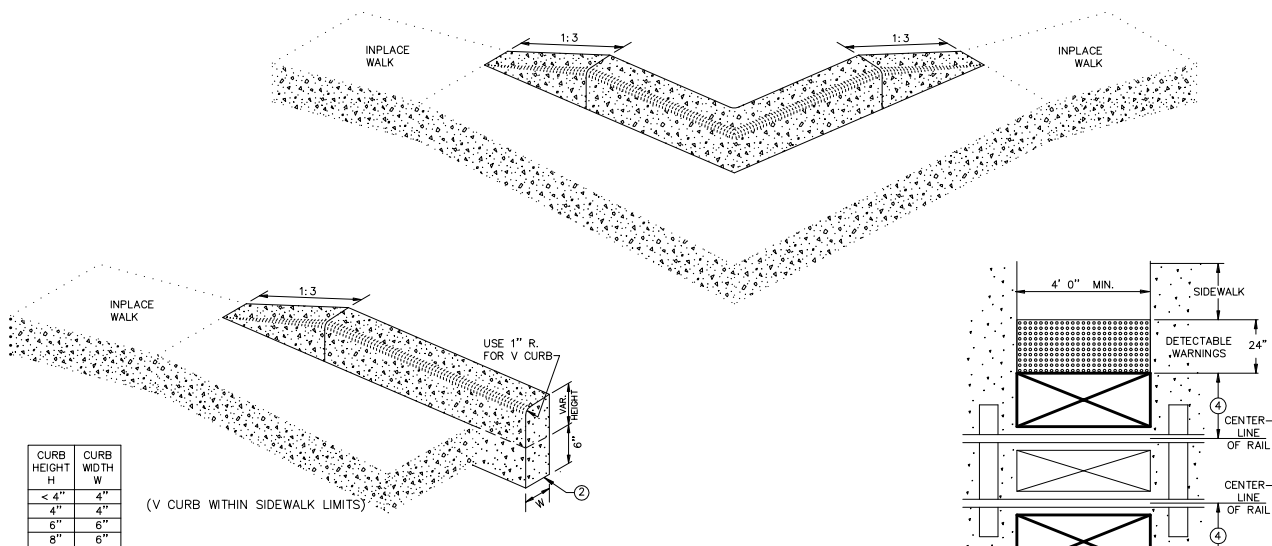


LAST REVISION
NOVEMBER 2014

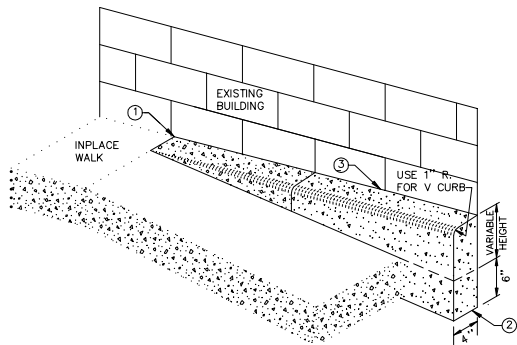
PEDESTRIAN CURB RAMP 4 OF 5

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
CONC-6

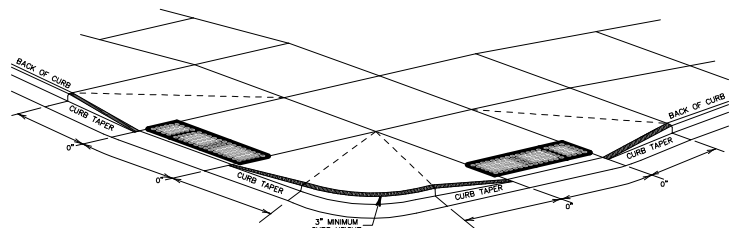
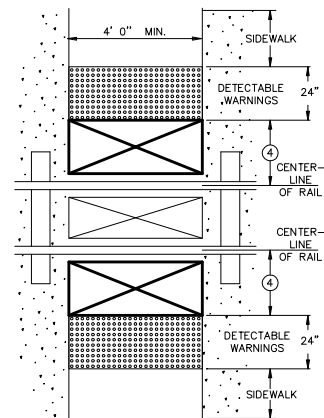


V CURB ADJACENT TO LANDSCAPE

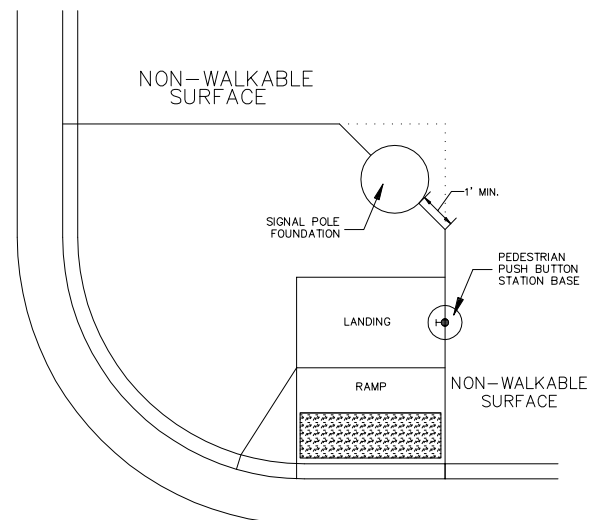


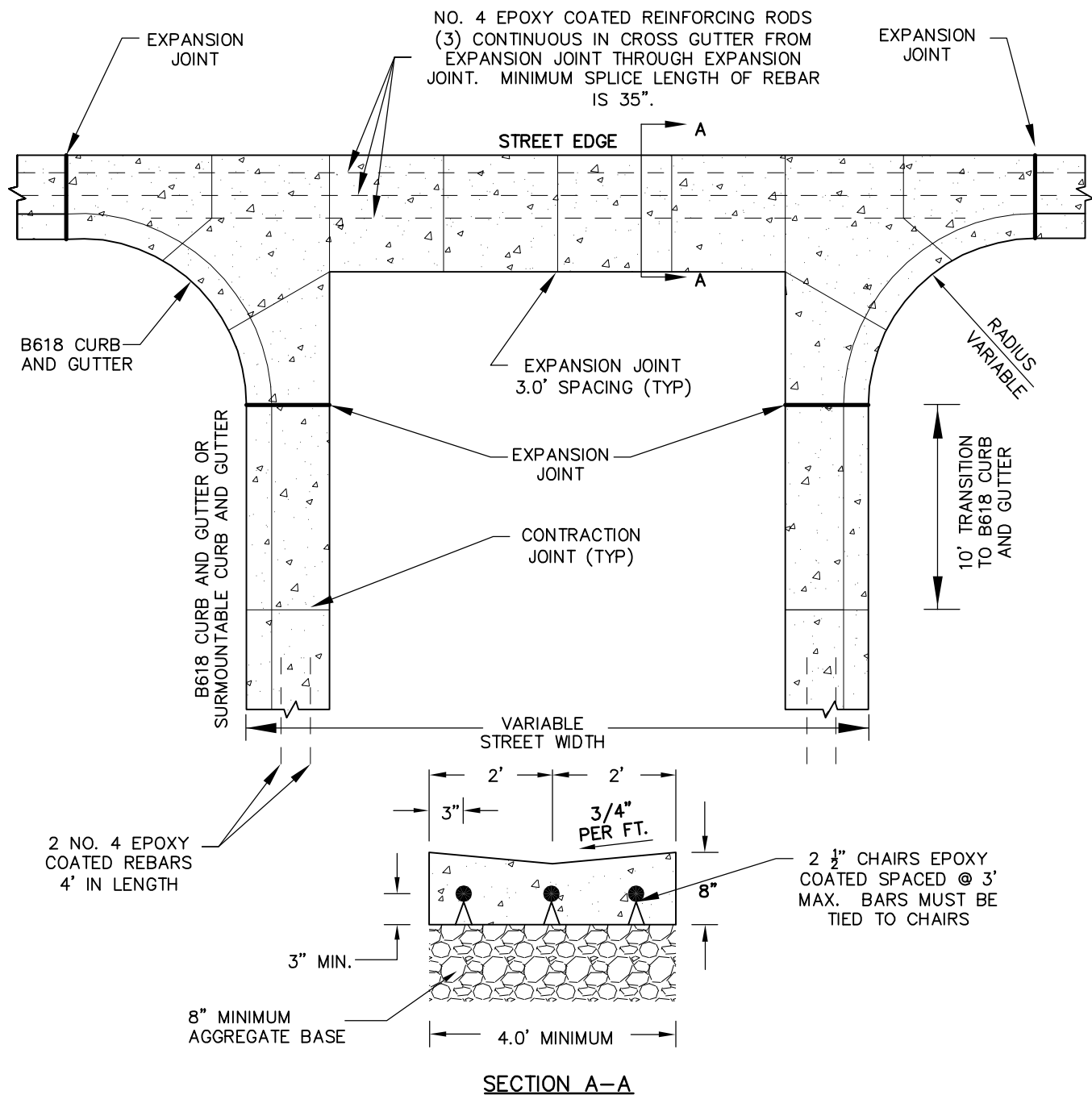
NOTES:

- ALL V-CURB CONTRACTION JOINTS SHALL MATCH CONCRETE WALK JOINTS
- V-CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN R.O.W. ALLOWS
- V-CURB NEXT TO BUILDING SHALL BE A 4" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS
- ① END TAPERS AT TRANSITION SECTION SHALL MATCH INPLACE SIDEWALK GRADES.
- ② ALL V-CURB SHALL MATCH BOTTOM OF ADJACENT WALK.
- ③ EDGE BETWEEN NEW V-CURB AND INPLACE STRUCTURE SHALL BE SEALED AND BOND BREAKER SHALL BE USED BETWEEN EXISTING STRUCTURE AND PLACED V-CURB.
- ④ EDGE OF DETECTABLE WARNING SURFACES SHALL BE PLACED 6' MINIMUM TO 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. WHEN PEDESTRIAN GATES ARE PROVIDED, DETECTABLE WARNING SURFACES SHALL BE PLACED ON THE SIDE OF THE GATES OPPOSITE THE RAIL.



ALL CONSTRUCTED CURBS MUST HAVE A CONTINUOUS DETECTABLE EDGE FOR THE VISUALLY IMPAIRED. THIS DETECTABLE EDGE REQUIRES TRUNCATED DOMES WHEREVER THERE IS ZERO INCH HIGH CURB. CURB TRANSITIONS ARE CONSIDERED A DETECTABLE EDGE WHEN THE TAPER STARTS IMMEDIATELY AT THE EDGE OF THE TRUNCATED DOMES AND UNIFORMLY RISES TO A 3 INCH MINIMUM CURB HEIGHT. ANY CURB NOT PART OF A CURB TRANSITION AND LESS THAN 3 INCHES IN HEIGHT IS NOT CONSIDERED A DETECTABLE EDGE AND THEREFORE IS NOT COMPLIANT.





NOTES:

WHEN INSTALLING A VALLEY GUTTER NEXT TO EXISTING BITUMINOUS ROADWAY, THE CONTRACTOR MUST SAWCUT AND REPLACE A MINIMUM 18" STRIP OF STREET SECTION WITH THE SAME PAVEMENT TYPE TO MATCH EXISTING STREET SECTION

VALLEY GUTTER TO BE PAID BY THE SQUARE YARD FROM RADII TO RADII OF B618 CURB AND GUTTER

WHEN INSTALLING A VALLEY GUTTER OVER A CATCH BASIN USING NEENAH FRAME AND CASTING R-3290-A

EXPANSION JOINT MATERIAL SHALL BE CLOSED CELL POLYETHYLENE



LAST REVISION

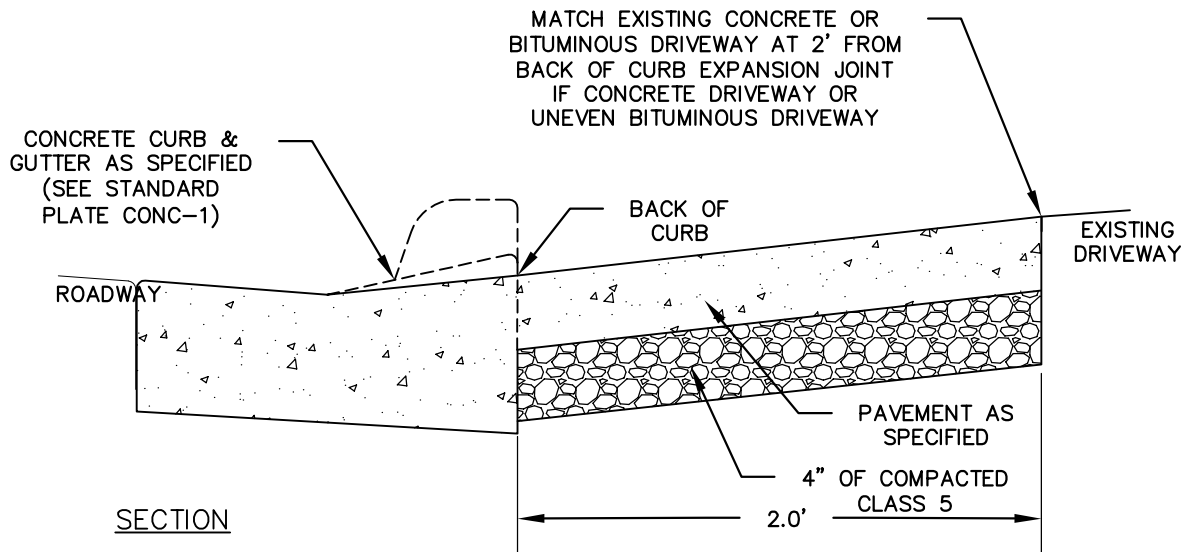
CONCRETE VALLEY GUTTER

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
CONC-8

CONCRETE
 5" THICK (RESIDENTIAL) OR
 8" THICK (COMMERCIAL)
 4" OF COMPACTED CLASS
 5 AGGREGATE BASE

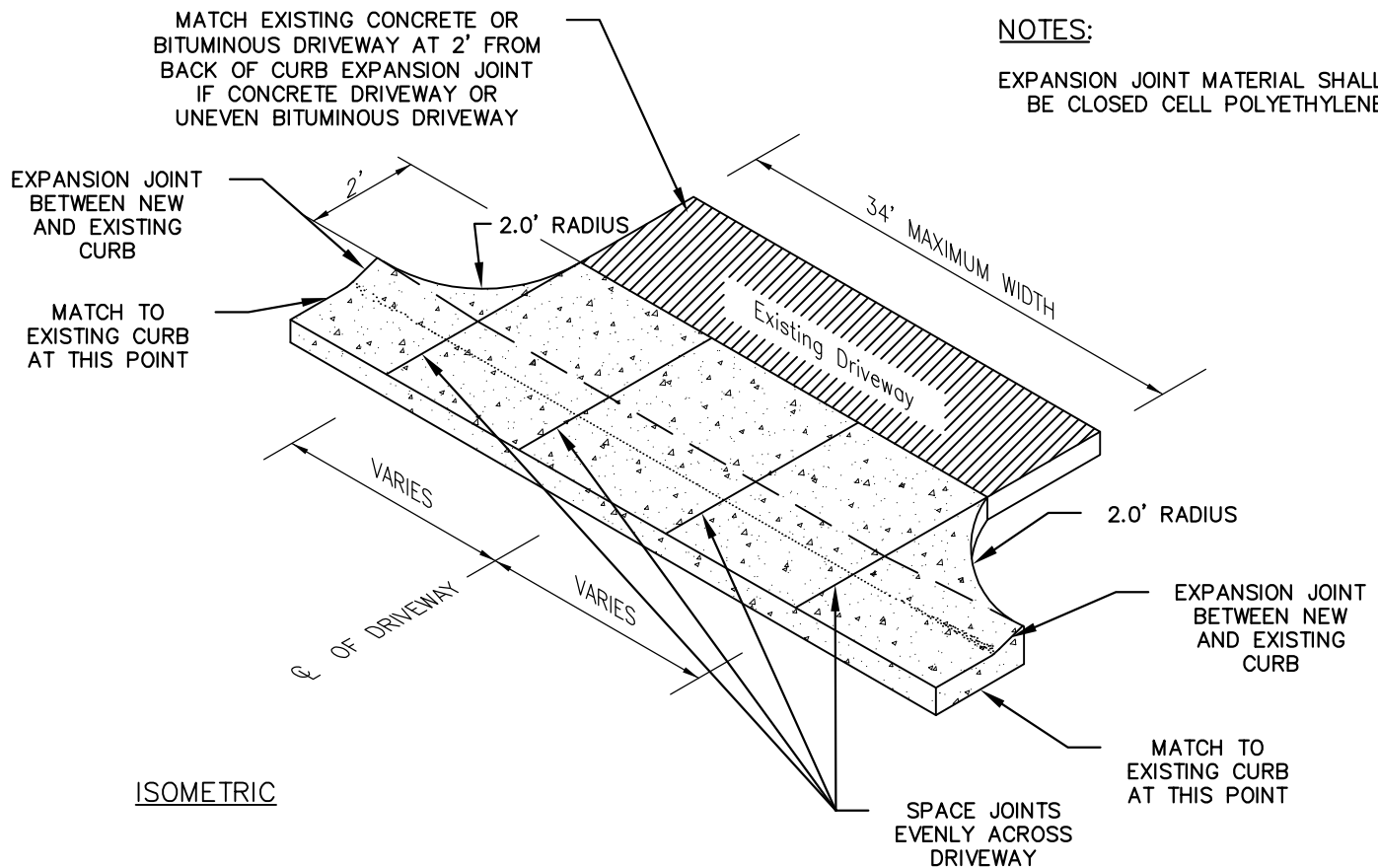
BITUMINOUS DRIVEWAY
 3" THICK TYPE SPWEA240B
 4" OF COMPACTED CLASS 5
 AGGREGATE BASE



SECTION

NOTES:

EXPANSION JOINT MATERIAL SHALL
 BE CLOSED CELL POLYETHYLENE



ISOMETRIC

MAXIMUM DRIVEWAY WIDTH: 34'



LAST REVISION
 NOVEMBER 2014

RESIDENTIAL / COMMERCIAL DRIVEWAY 2' APRON POURED INTEGRALLY

CITY OF MAPLE GROVE ENGINEERING
 & PUBLIC WORKS DEPARTMENTS

STANDARD
 PLATE #
 CONC-9

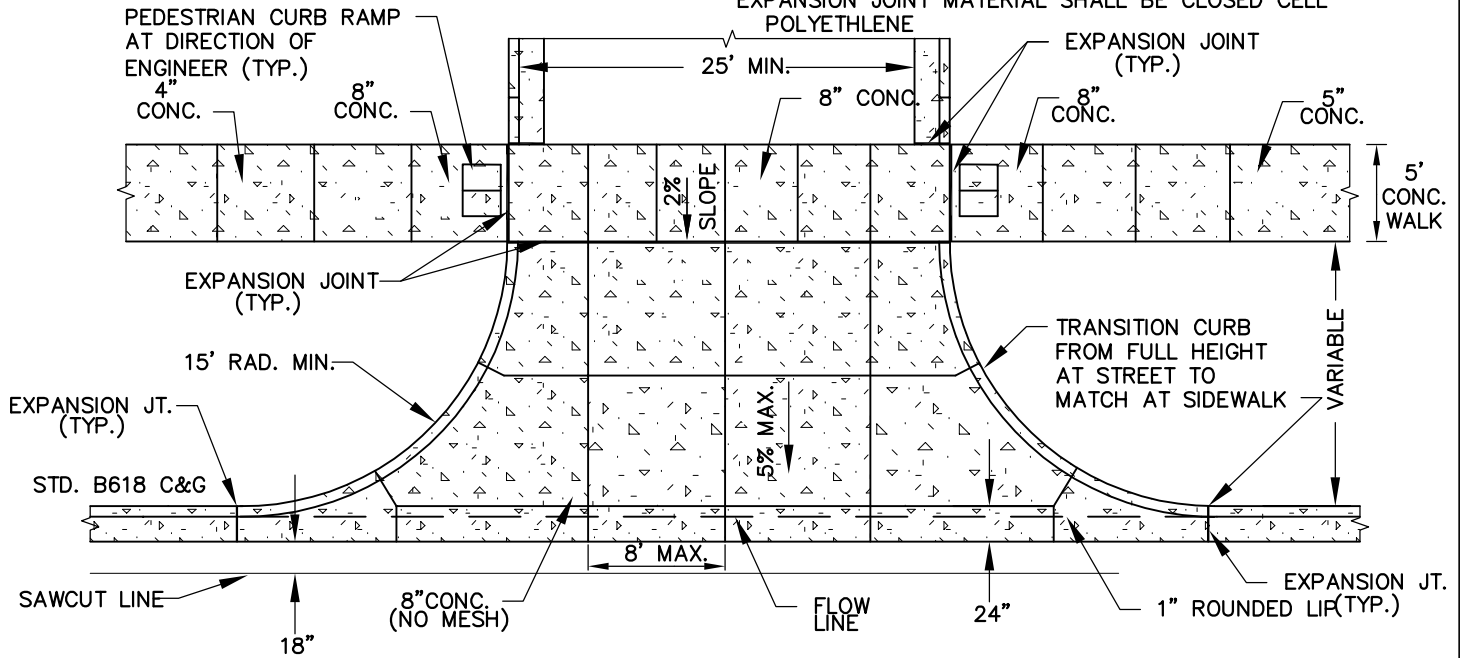
NOTES:

FORM CONTRACTION JOINT AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANELS (MAX. AREA OF 64 S.F.)

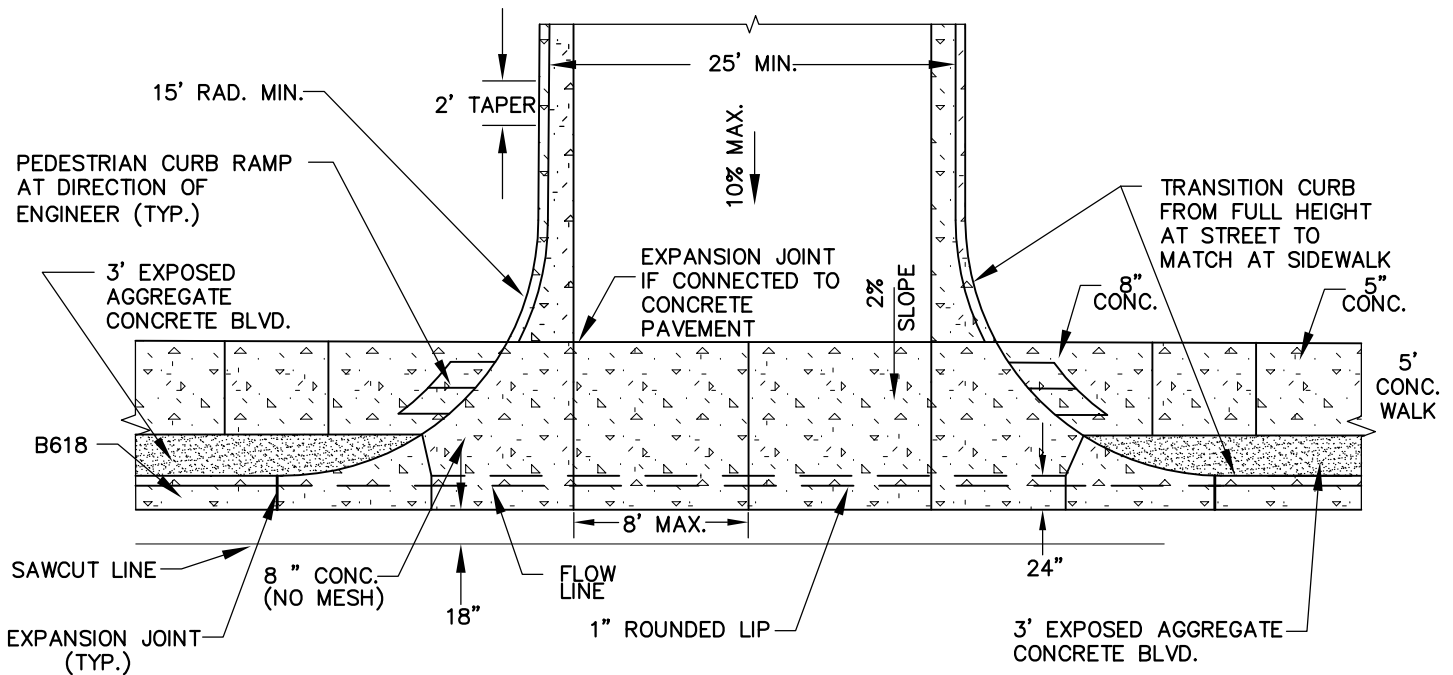
8" CLASS 5 BASE

4" BIT PAVEMENT IN 2 - 2" LIFTS

EXPANSION JOINT MATERIAL SHALL BE CLOSED CELL POLYETHYLENE



COMMERCIAL DRIVEWAY WITH SIDEWALK

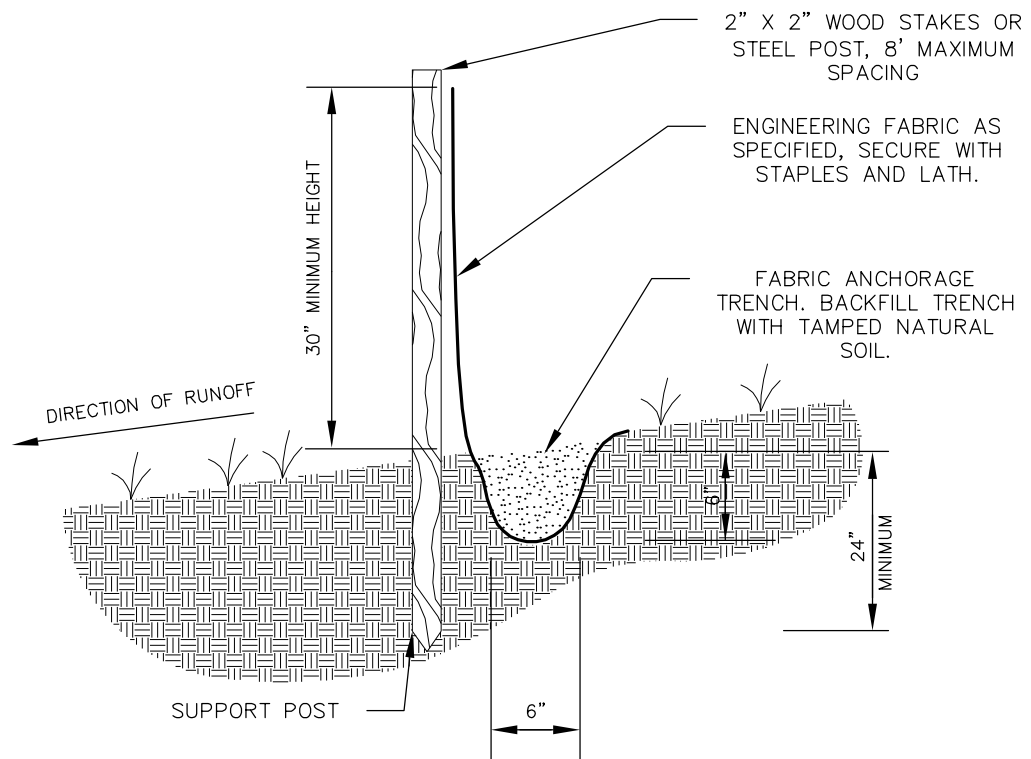


LAST REVISION
NOVEMBER 2014

INDUSTRIAL / COMMERCIAL DRIVEWAY APRON

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
CONC-10

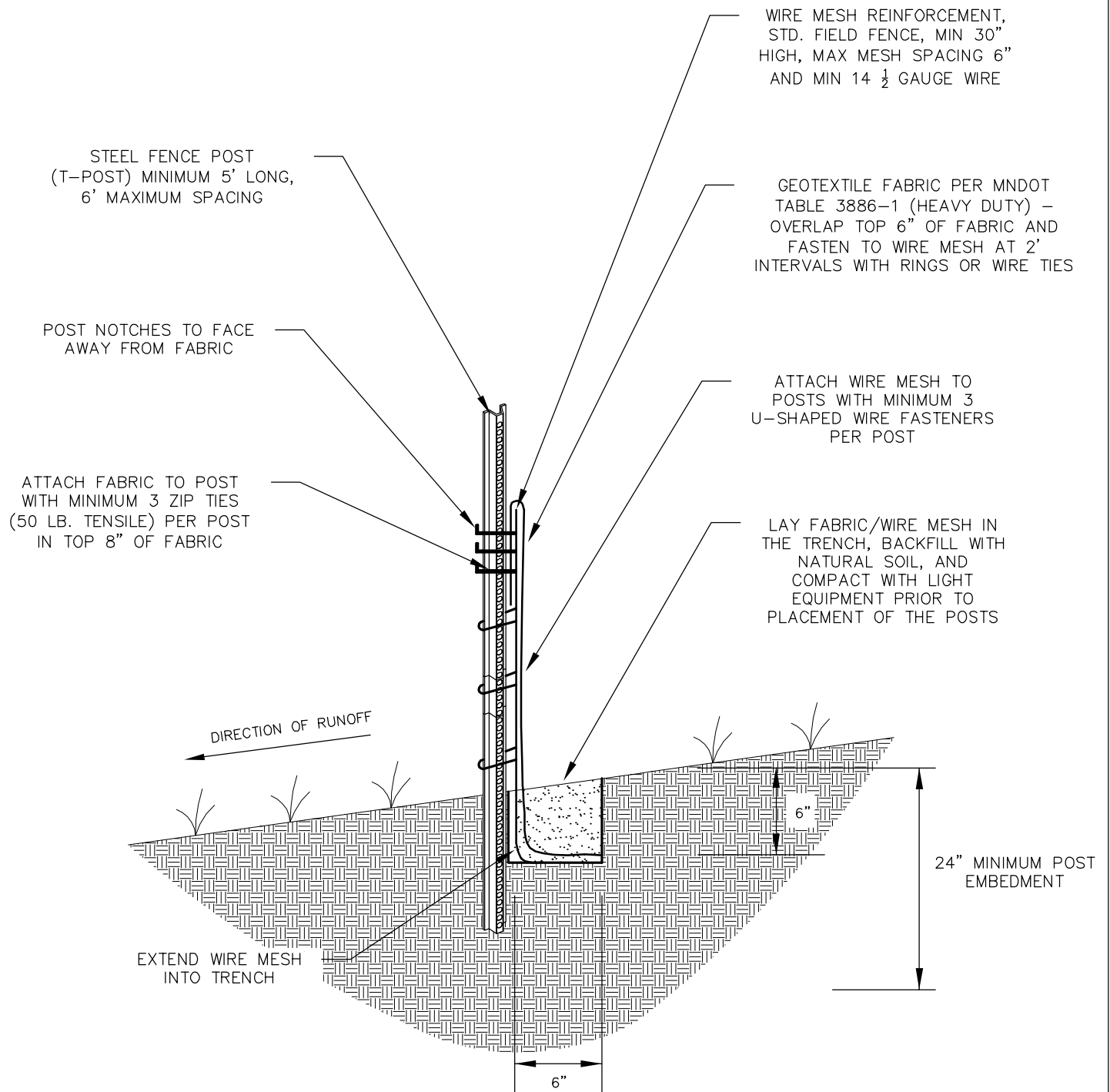


LAST REVISION
JANUARY 2010

SILT FENCE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-1



NOTES:

HEAVY DUTY SILT FENCE IS FOR USE ON SLOPES GREATER THAN OR EQUAL TO A 4:1 OR WITHIN 200 FT OF ANY TYPE OF WATER OR STREAM.



City of
Maple Grove

LAST REVISION
JANUARY 2016

HEAVY DUTY SILT FENCE

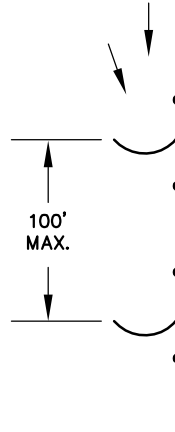
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-2

PLAN VIEW

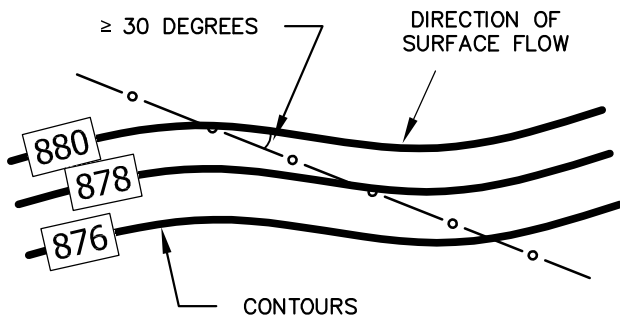
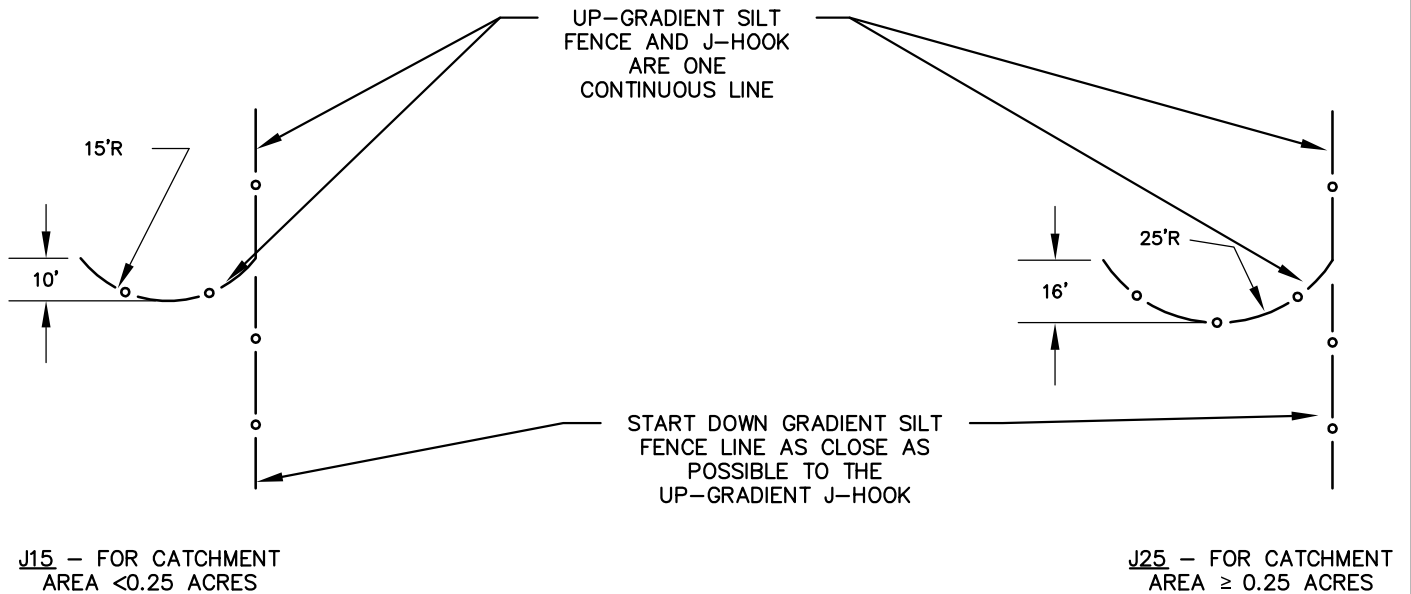
SPACING REQUIREMENTS

DIRECTION OF SURFACE FLOW

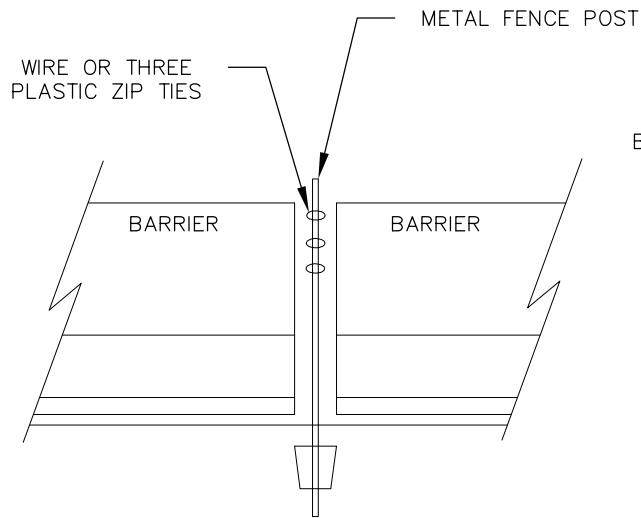


NOTE:
SPACING DISTANCES WILL VARY, BUT ARE NOT TO EXCEED 100 FEET

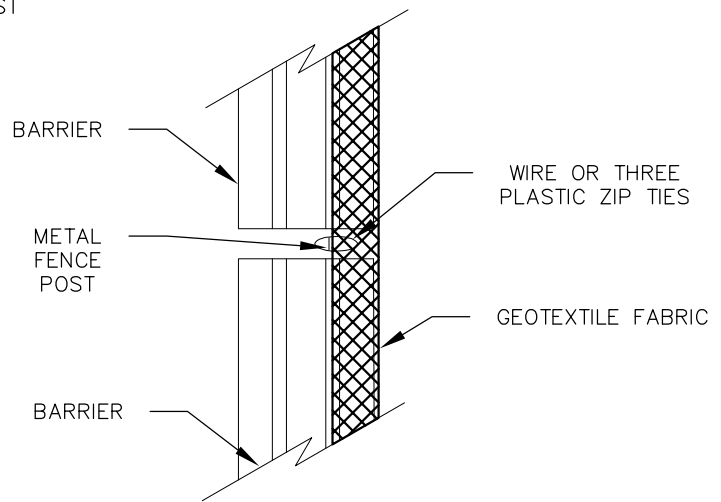
SIZING REQUIREMENTS: J15, J25



NOTE:
J-HOOKS SHALL BE USED WHEN THE SILT FENCE IS INSTALLED AT AN ANGLE OF 30° OR GREATER FROM PARALLEL TO THE CONTOURS

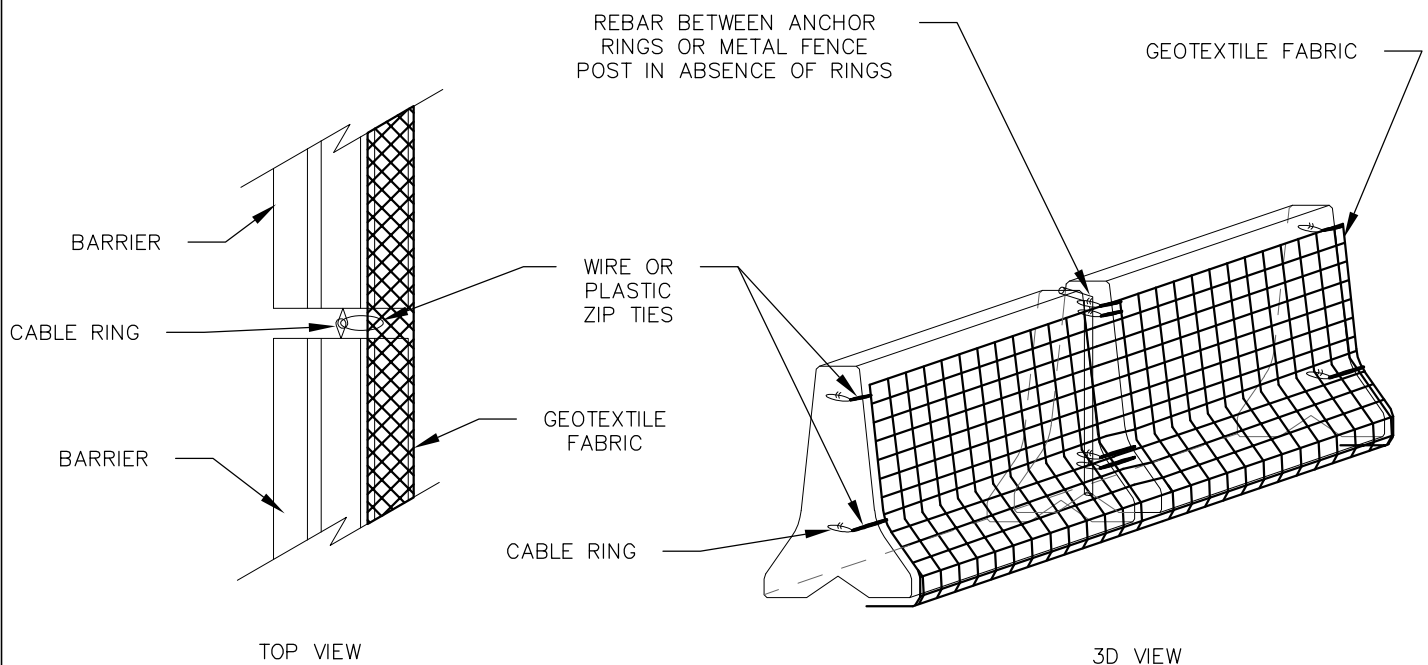


SIDE VIEW



TOP VIEW

BARRIER WITHOUT CABLE RINGS



TOP VIEW

3D VIEW

BARRIER WITH CABLE RINGS SILT FENCE, SUPER DUTY

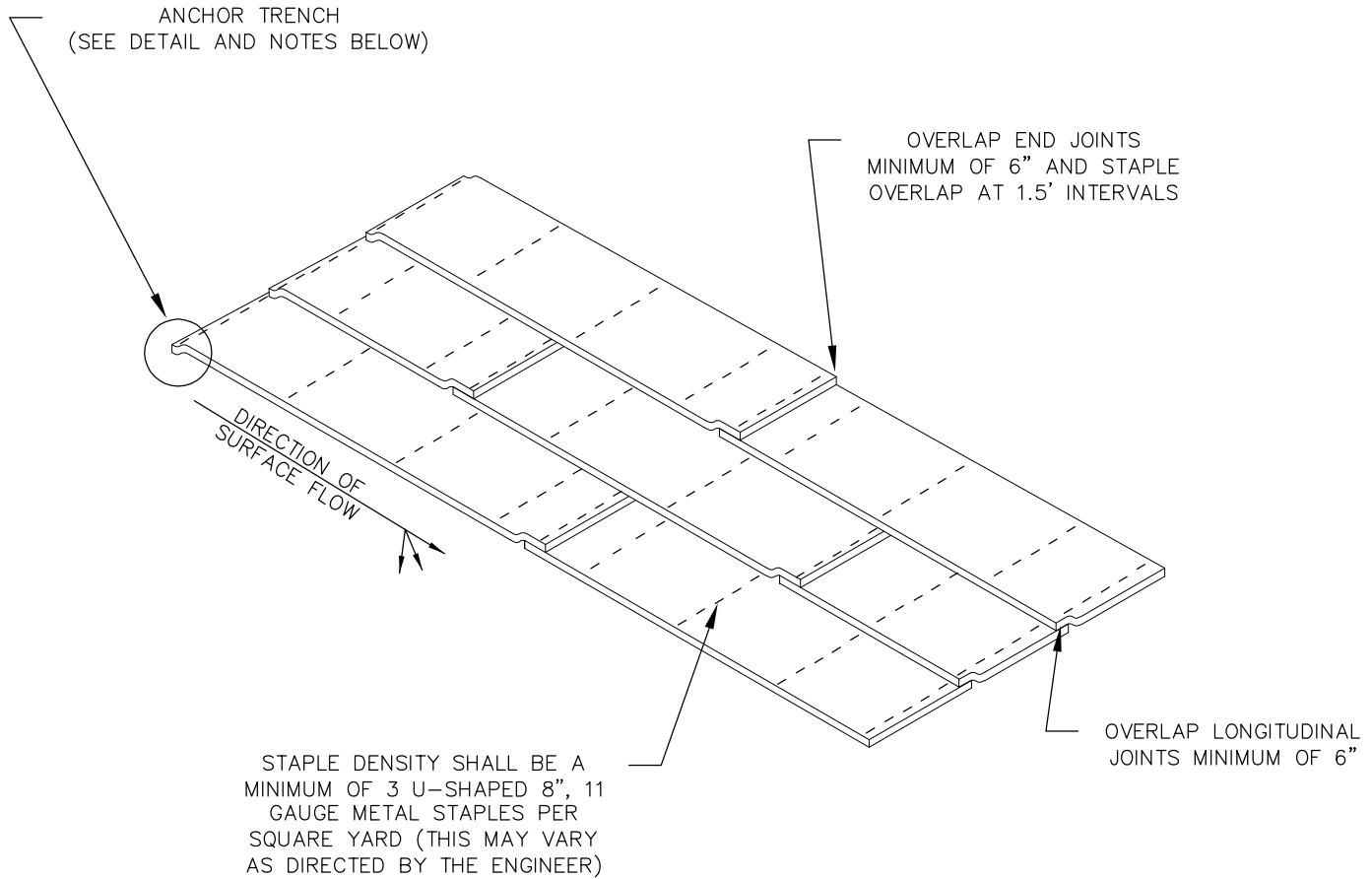


LAST REVISION
NOVEMBER 2014

SUPER DUTY PERIMETER CONTROL SILT FENCE / CONCRETE BARRIER SYSTEM

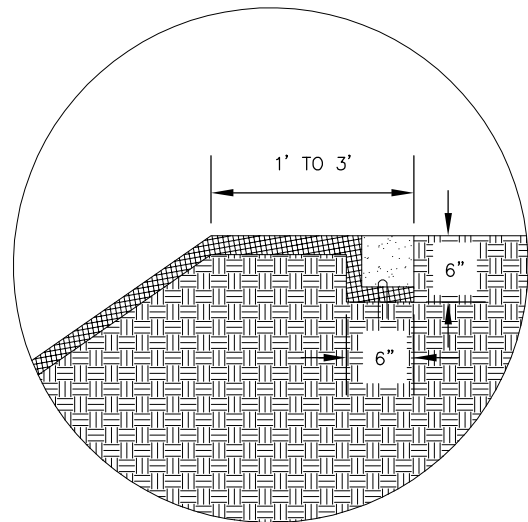
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-4



ANCHOR TRENCH

1. DIG 6" X 6" TRENCH
2. LAY BLANKET IN TRENCH
3. STAPLE AT 1.5' INTERVALS
4. BACKFILL WITH NATURAL SOIL AND COMPACT
5. BLANKET LENGTH SHALL NOT EXCEED 100'
WITHOUT AN ANCHOR TRENCH

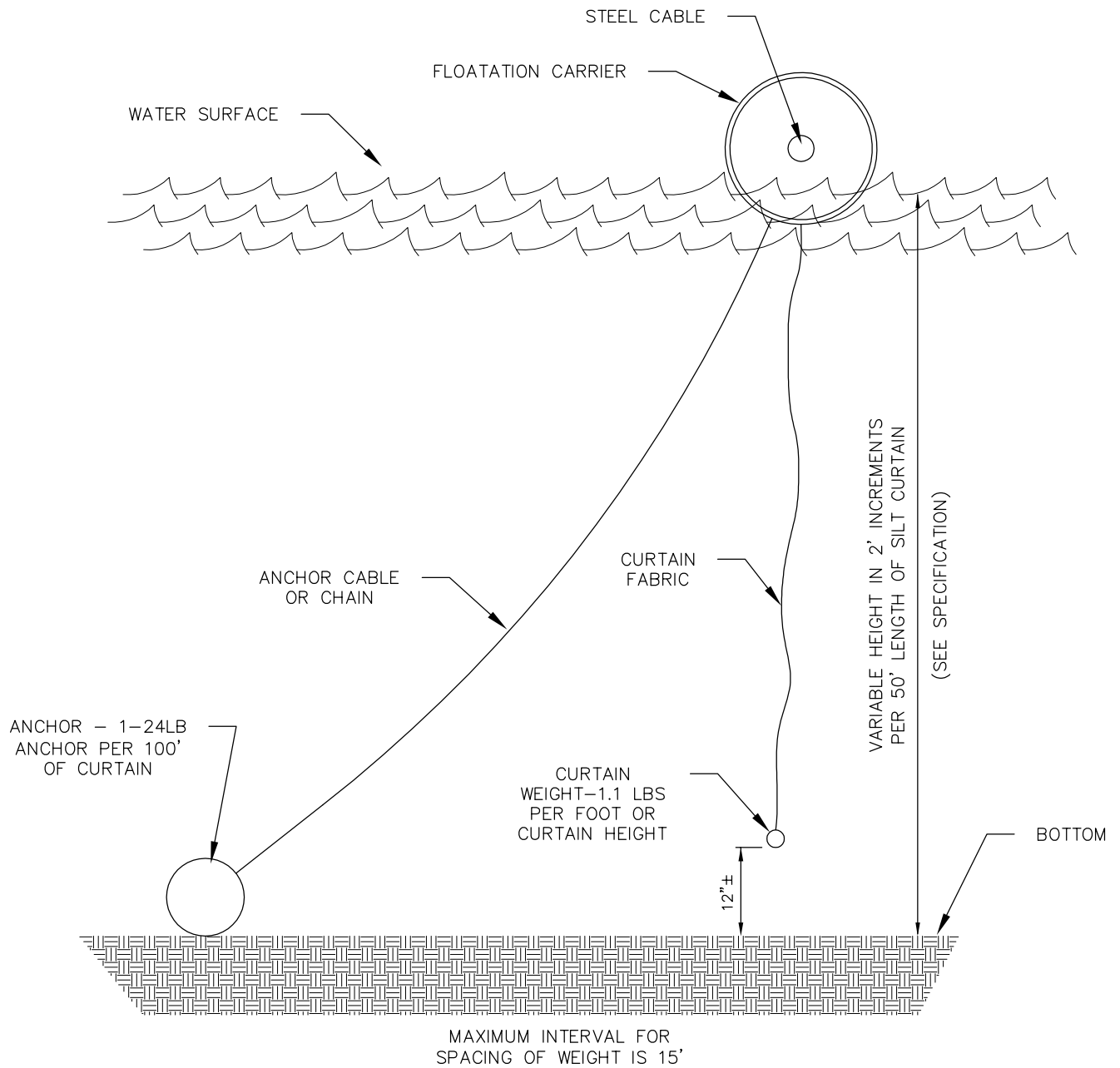


LAST REVISION
NOVEMBER 2014

EROSION CONTROL BLANKET INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-5

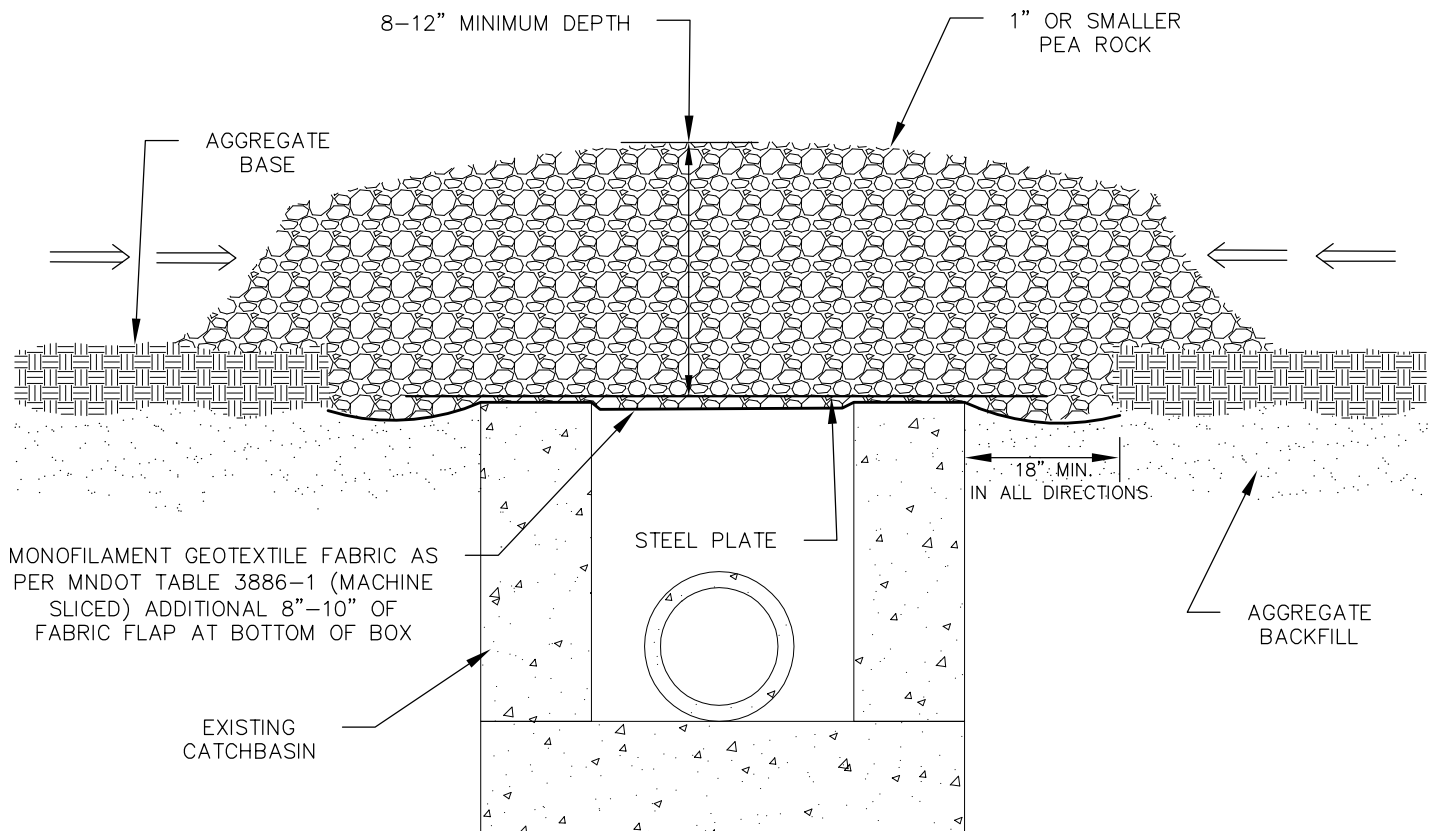
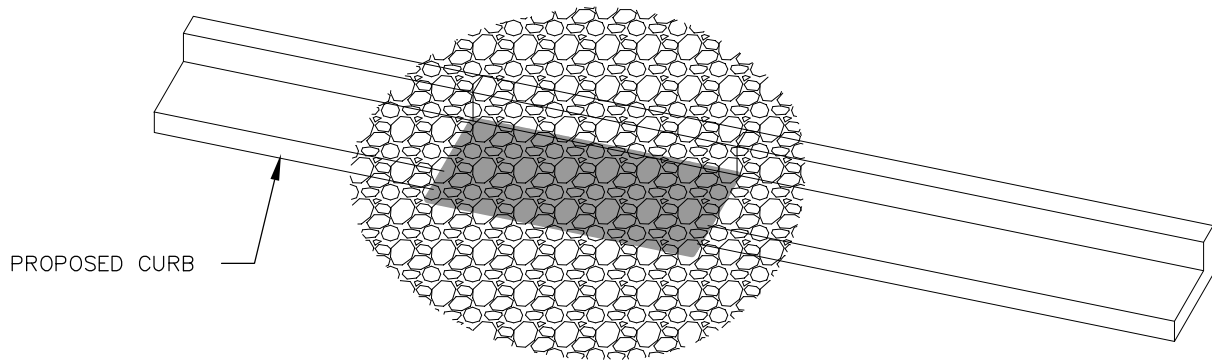


NOTES:

DOUBLE SILT CURTAIN SHOULD BE SPACED 10' APART.

CURTAIN LENGTH TO MATCH BOTTOM PROFILE AS CLOSELY AS POSSIBLE

PLAN

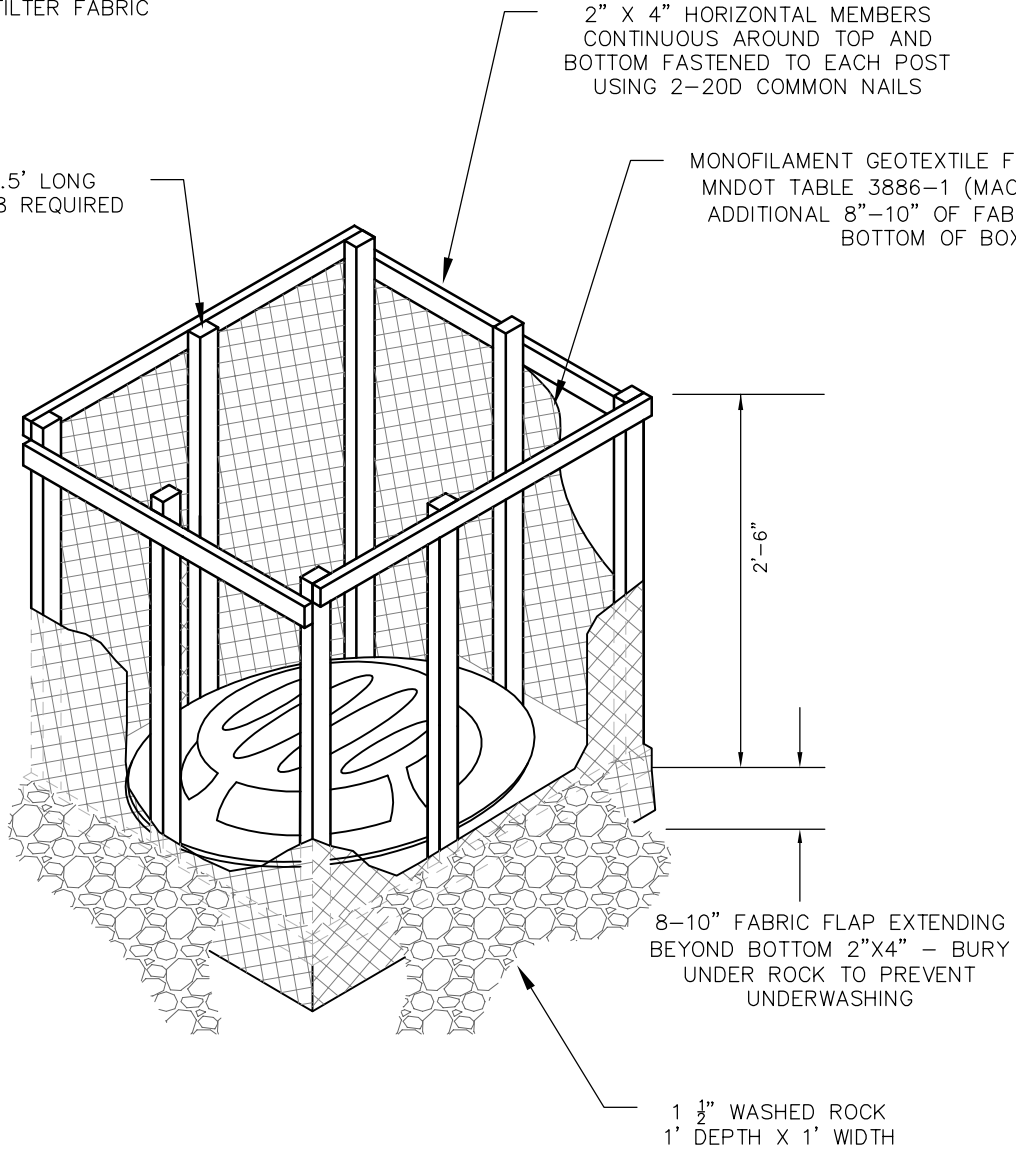


WOODEN LATH SHALL BE NAILED
SECURELY TO THE POST MEMBER
TO SECURE FILTER FABRIC

2" X 4" HORIZONTAL MEMBERS
CONTINUOUS AROUND TOP AND
BOTTOM FASTENED TO EACH POST
USING 2-20D COMMON NAILS

2" X 4" X 2.5' LONG
WOOD POSTS, 8 REQUIRED

MONOFILAMENT GEOTEXTILE FABRIC AS PER
MNDOT TABLE 3886-1 (MACHINE SLICED)
ADDITIONAL 8"-10" OF FABRIC FLAP AT
BOTTOM OF BOX



NOTES:

CONTRACTOR SHALL CONSTRUCT SILT BOX TO FIT
AROUND THE INLET STRUCTURE WITH 6" MINIMUM
CLEARANCE TO EDGES OF STRUCTURE. SILT BOX TO
BE PLACED ON AN EVEN SURFACE 6" BELOW
STRUCTURE OPENING. TOP OF SILT BOX TO EXTEND
18" MINIMUM ABOVE EXISTING GRADE.

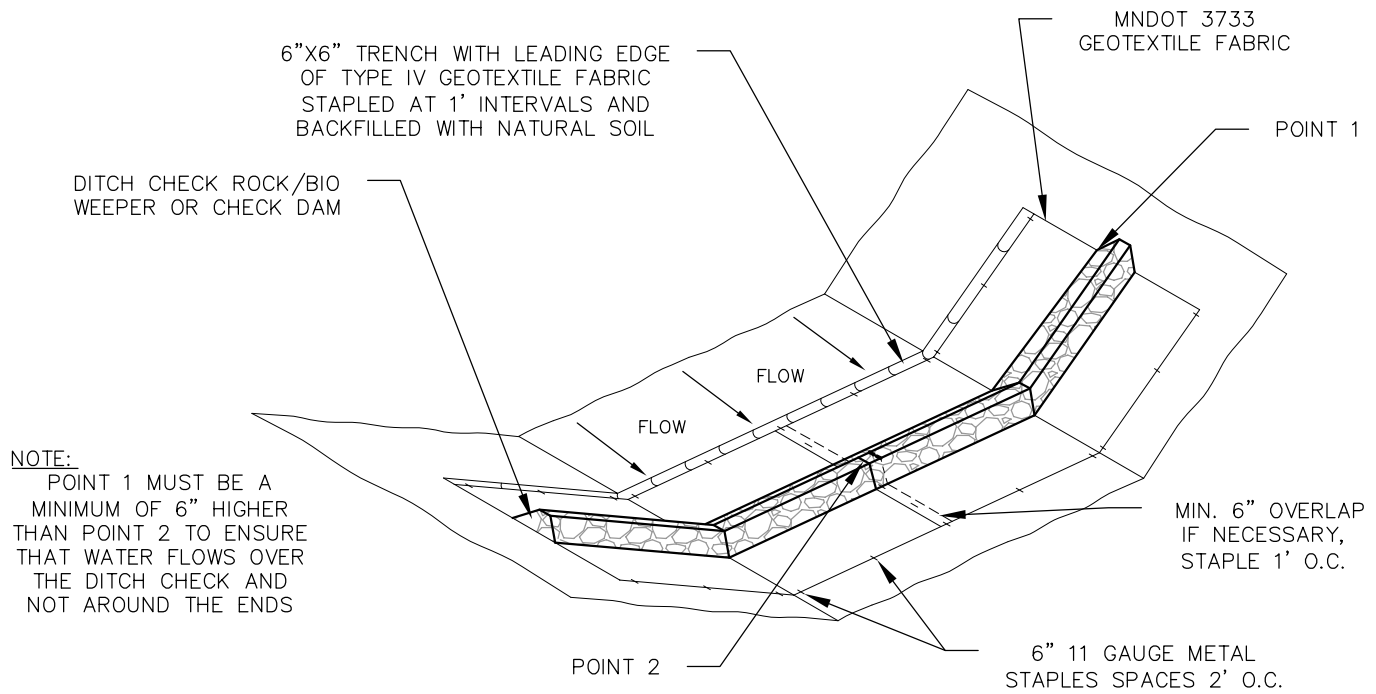


LAST REVISION
NOVEMBER 2014

INLET PROTECTION SILT BOX FOR BEEHIVE CASTING

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-8



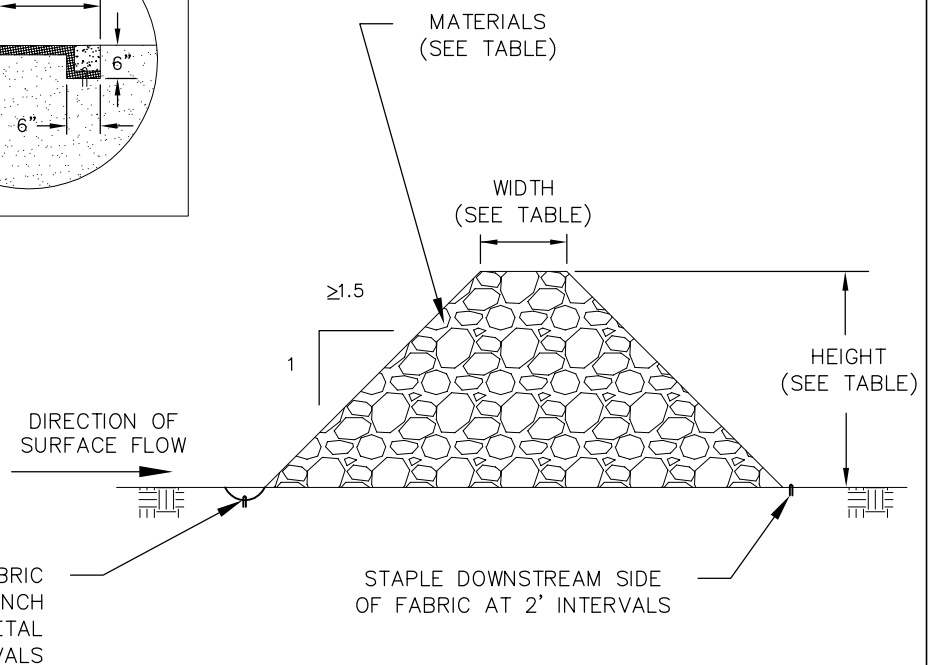
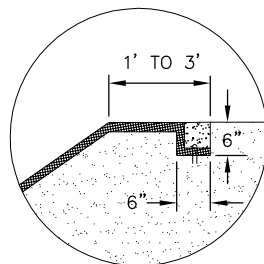
NOTE:

POINT 1 MUST BE A MINIMUM OF 6" HIGHER THAN POINT 2 TO ENSURE THAT WATER FLOWS OVER THE DITCH CHECK AND NOT AROUND THE ENDS

	HEIGHT (INCHES)	WIDTH (INCHES)	MATERIAL
SMALL CHECK	24	12-18	MNDOT 3601 CLASS II RIP RAP
LARGE CHECK	36	24-30	MNDOT 3601 CLASS III RIP RAP
ROCK WEEPER	18	6-12	MNDOT 3882 TYPE 9 MULCH (1 1/2" WASHED ROCK)

ANCHOR TRENCH

1. DIG 6"X6" TRENCH
2. LAY BLANKET IN TRENCH
3. STAPLE AT 1.5' INTERVALS
4. BACKFILL WITH NATURAL SOIL AND COMPACT



LAST REVISION
NOVEMBER 2014

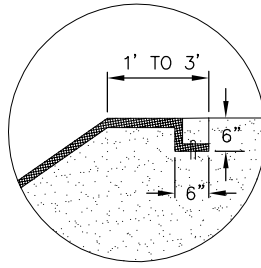
ROCK DITCH CHECK / WEEPER SIZING & MATERIALS

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-9

ANCHOR TRENCH

1. DIG 6"x6" TRENCH
2. LAY BLANKET IN TRENCH
3. STAPLE AT 1.5' INTERVALS
4. BACKFILL WITH NATURAL SOIL AND COMPACT

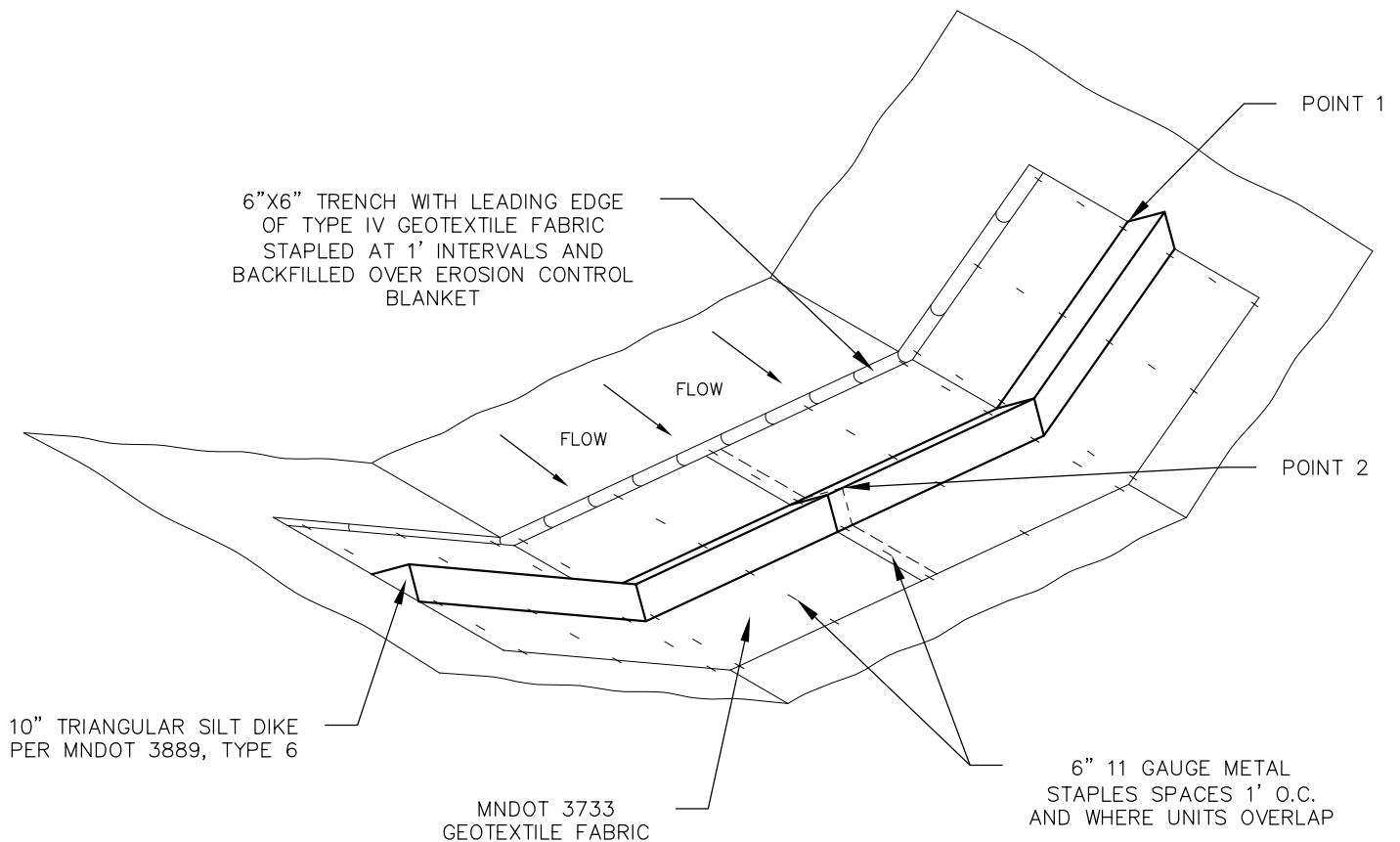


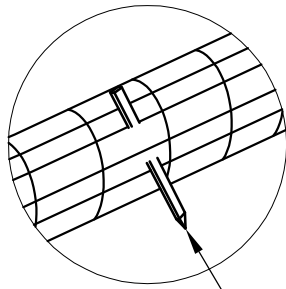
NOTE:

STAPLE DENSITY SHALL CONFORM TO MANUFACTURERS SPECIFICATIONS

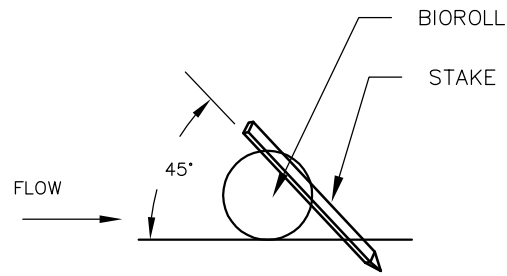
NOTE:

POINT 1 MUST BE A MINIMUM OF 6" HIGHER THAN POINT 2 TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS





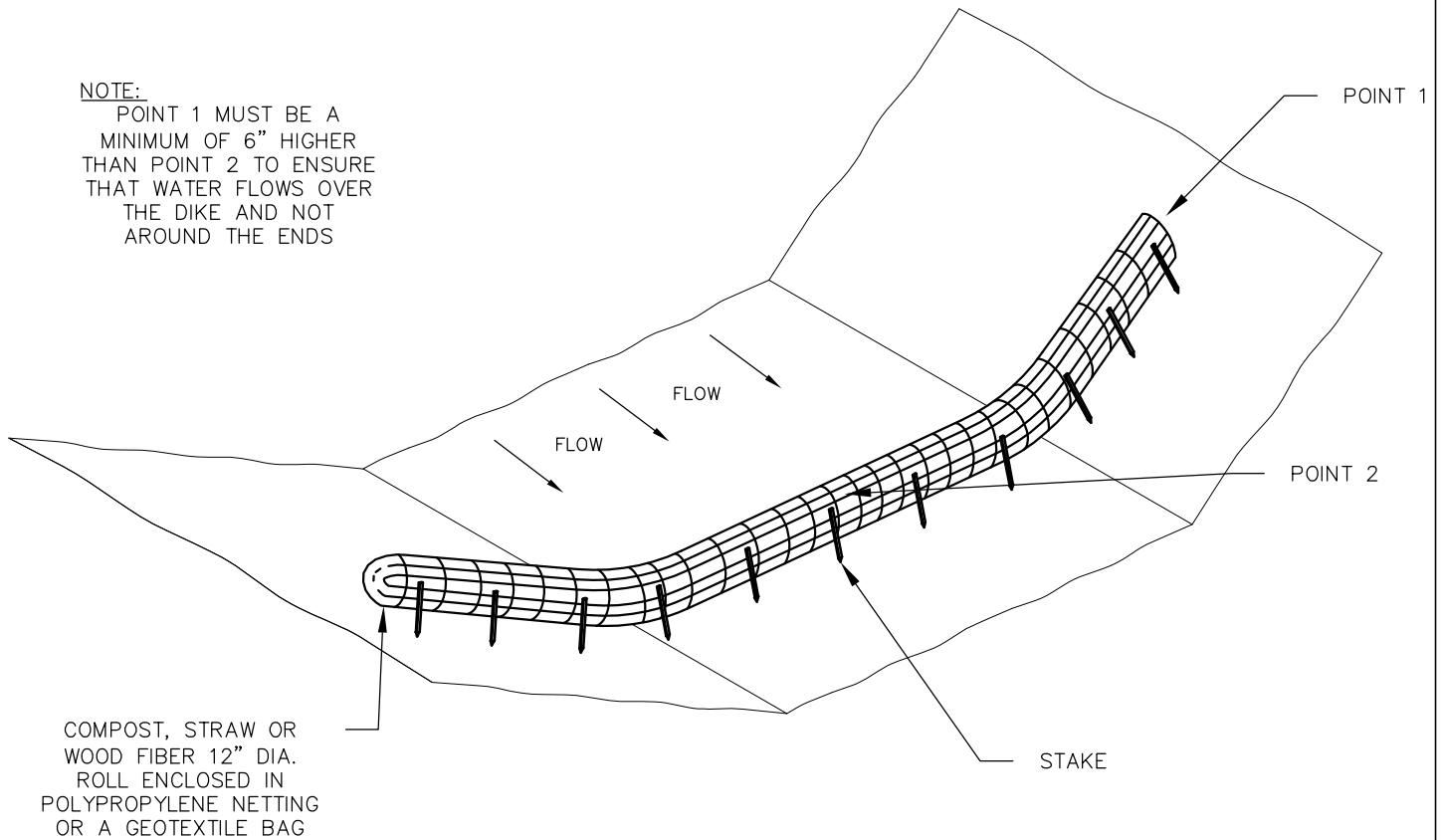
STAKE



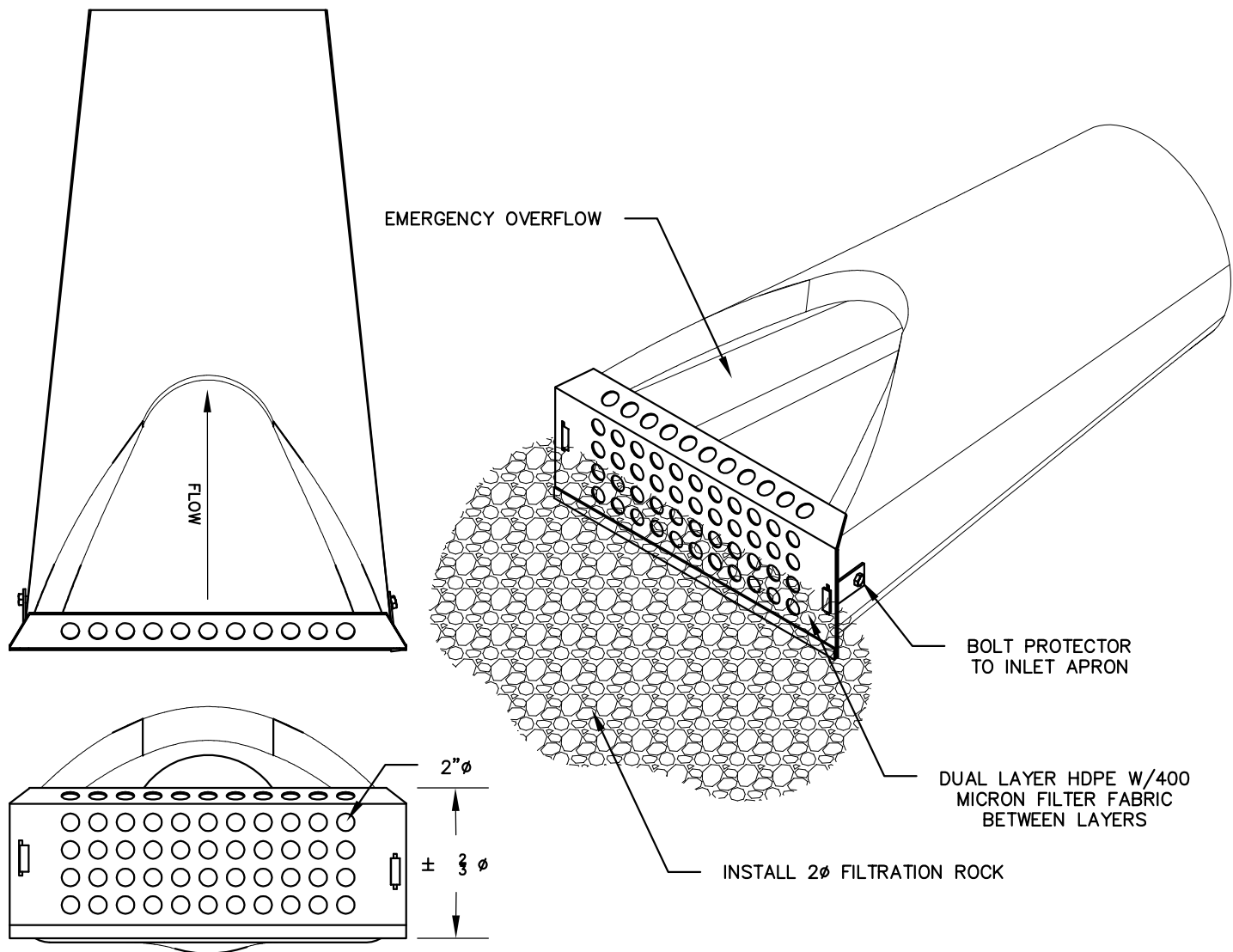
2"X2"X16" LONG WOODEN
STAKES AT 1'-0"
SPACING MINIMUM. STAKES
SHALL BE DRIVEN
THROUGH THE BACK HALF
OF THE COMPOST LOG AT
AN ANGLE OF 45° WITH
THE TOP OF THE STAKE
POINTING UPSTREAM

NOTE:

POINT 1 MUST BE A
MINIMUM OF 6" HIGHER
THAN POINT 2 TO ENSURE
THAT WATER FLOWS OVER
THE DIKE AND NOT
AROUND THE ENDS

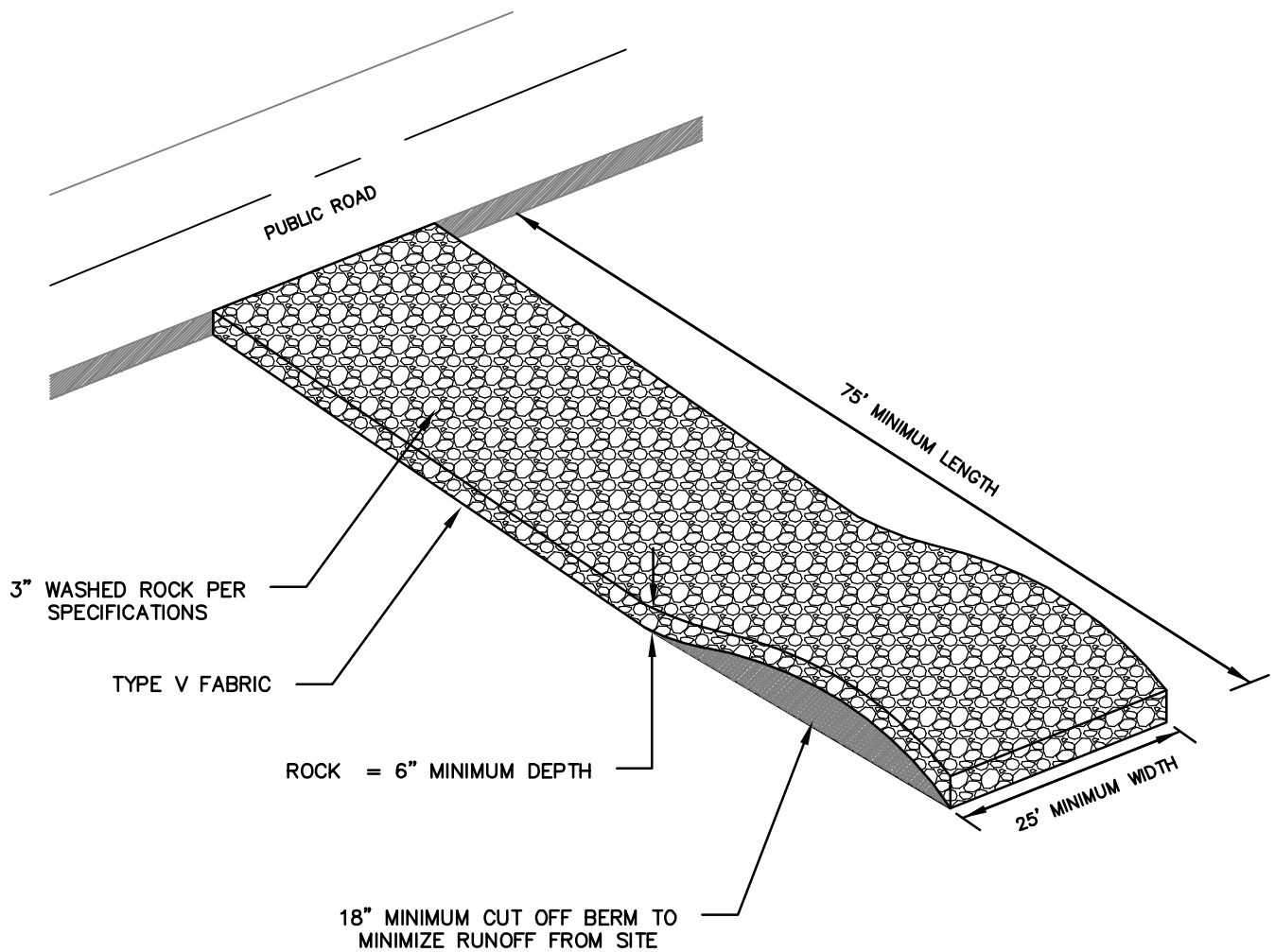


COMPOST, STRAW OR
WOOD FIBER 12" DIA.
ROLL ENCLOSED IN
POLYPROPYLENE NETTING
OR A GEOTEXTILE BAG



NOTE:
 FILTER FABRIC MAY BE REPLACED AS
 REQUIRES BY REMOVING BOLTS/RIVETS
 CONNECTING HDPE LAYERS AND
 BOLTING/RIVETING BACK TOGETHER

DEVICES SHOWN ARE AS MANUFACTURED BY
 ROYAL ENVIRONMENTAL SYSTEMS.
 INFRASAFE – CULVERT INLET PROTECTOR



NOTE:

TYPE V FILTER FABRIC SHALL BE PLACED UNDER ROCK TO STOP MUD MIGRATION THROUGH MATERIAL.

THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.

WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.

WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

WHERE RUNOFF CONTAINING SEDIMENT LADEN WATER IS LEAVING THE SITE VIA THE CONSTRUCTION ENTRANCE, OTHER MEASURES SHALL BE IMPLEMENTED TO DIVERT RUNOFF THROUGH AN APPROVED FILTERING SYSTEM



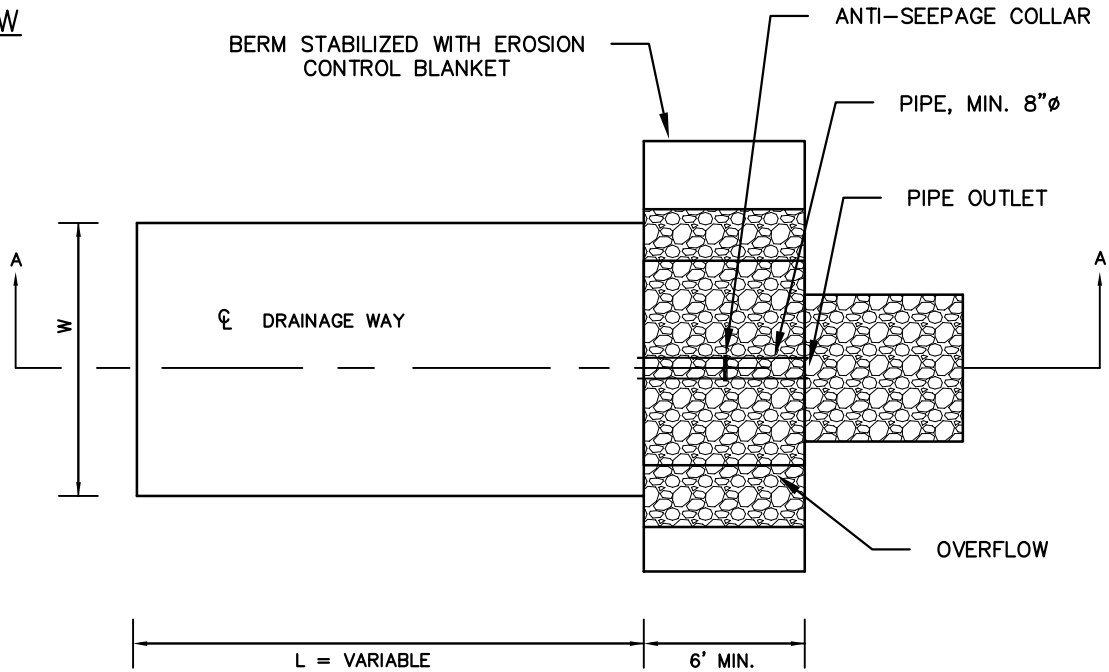
LAST REVISION
JANUARY 2016

CONSTRUCTION ROCK ENTRANCE

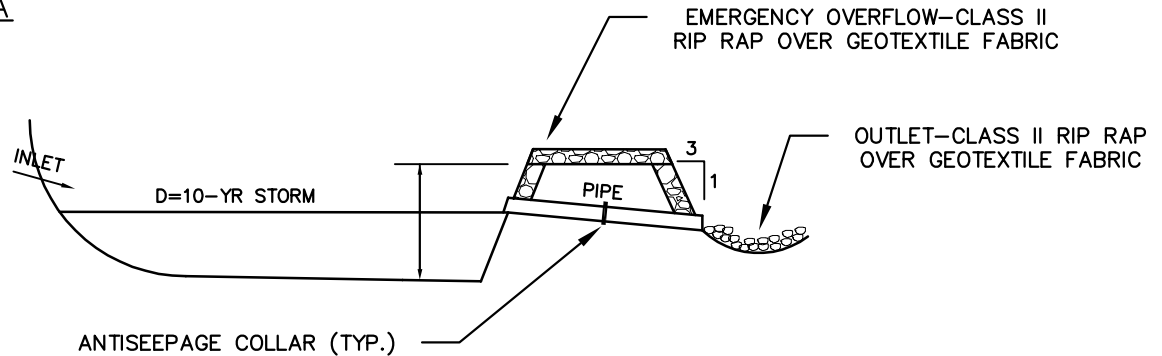
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-13

PLAN VIEW



SECTION A-A



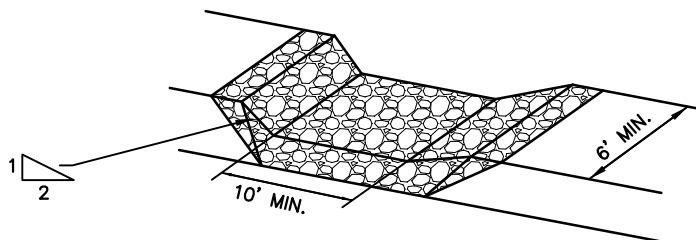
NOTE:
BASIN USED FOR 10 ACRE
DRAINAGE AREA OR MORE

DESIGN RUNOFF VOLUME IS
FROM A 2-YR, 24-HR
STORM PER ACRE DRAINED
TO THE BASIN

BASIN VOLUME MUST BE A
MINIMUM OF 1800 CUBIC
FEET/ACRE

SEE PLANS/SPECIFICATIONS
FOR BASIN DIMENSIONS AND
PIPE SIZE AND SLOPE

BASIN EMERGENCY OVERFLOW



LAST REVISION
NOVEMBER 2014

TEMPORARY SEDIMENTATION BASIN PIPE OUTLET

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-14

PLAN VIEW

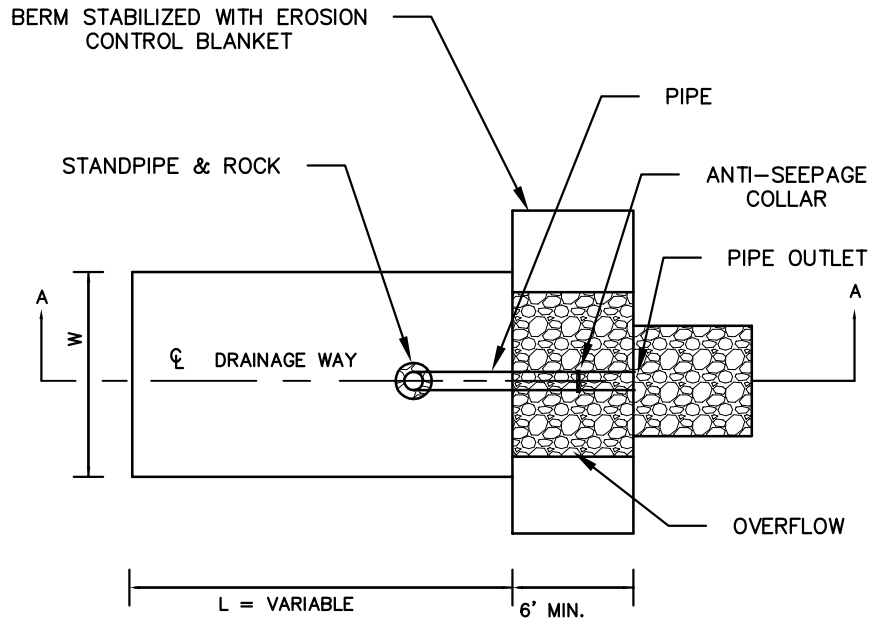
NOTE:

BASIN USED FOR 10 ACRE
DRAINAGE AREA OR MORE

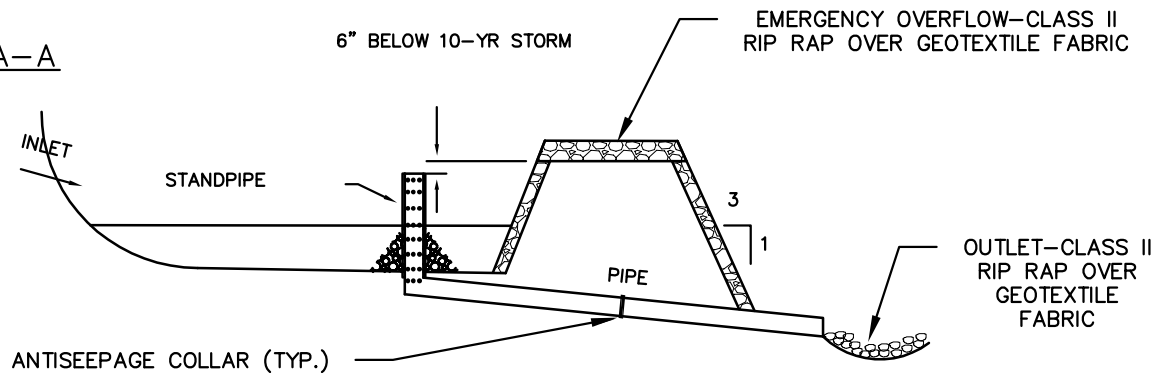
DESIGN RUNOFF VOLUME IS
FROM A 2-YR, 24-HR
STORM PER ACRE DRAINED
TO THE BASIN

BASIN VOLUME MUST BE A
MINIMUM OF 1800 CUBIC
FEET/ACRE

SEE PLANS/SPECIFICATIONS
FOR BASIN DIMENSIONS AND
PIPE SIZE AND SLOPE



SECTION A-A



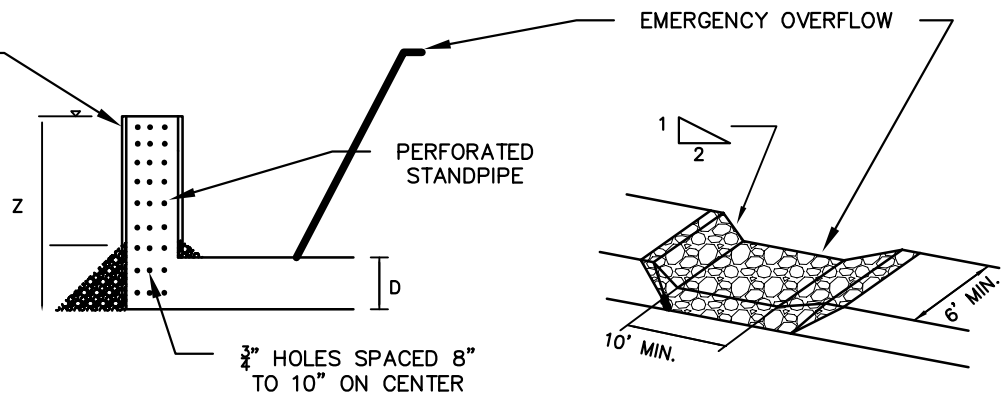
BASIN STANDPIPE AND EMERGENCY OVERFLOW

MONOFILAMENT
GEOTEXTILE FABRIC PER
MNDOT TABLE 3886-1
(MACHINE SLICED)

1"-2" ϕ ROCK,
CONE EQUAL TO $\frac{1}{3}$ Z

NOTE:

PIPE MATERIAL
SHOULD BE RIGID



D = DIAMETER OF STANDPIPE
EQUAL TO DIAMETER OF PIPE

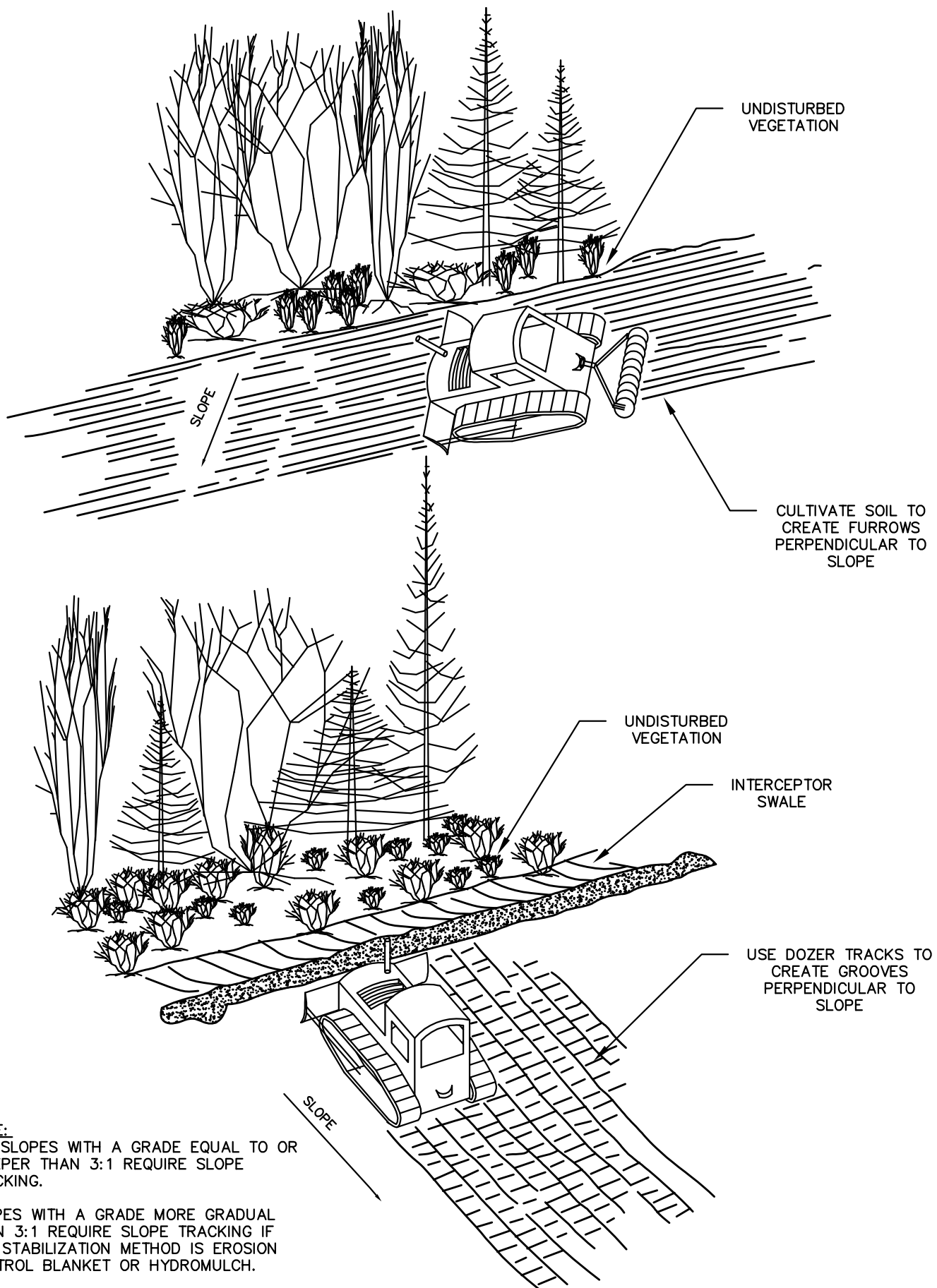


LAST REVISION
NOVEMBER 2014

TEMPORARY SEDIMENTATION BASIN STANDPIPE OUTLET

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-15



NOTE:

ALL SLOPES WITH A GRADE EQUAL TO OR STEEPER THAN 3:1 REQUIRE SLOPE TRACKING.

SLOPES WITH A GRADE MORE GRADUAL THAN 3:1 REQUIRE SLOPE TRACKING IF THE STABILIZATION METHOD IS EROSION CONTROL BLANKET OR HYDROMULCH.



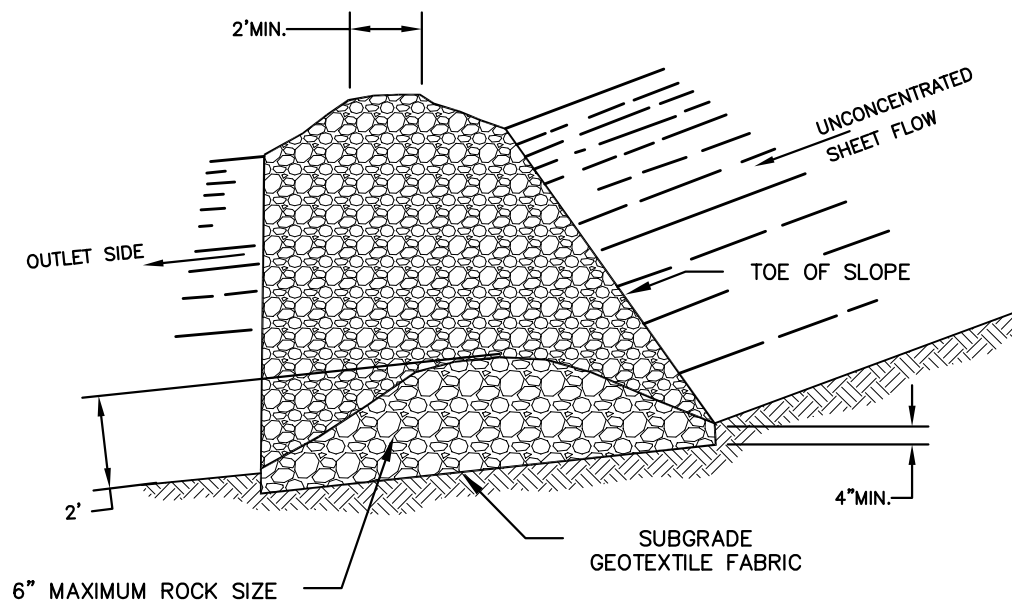
City of
Maple Grove

LAST REVISION
NOVEMBER 2014

SLOPE TRACKING

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-16



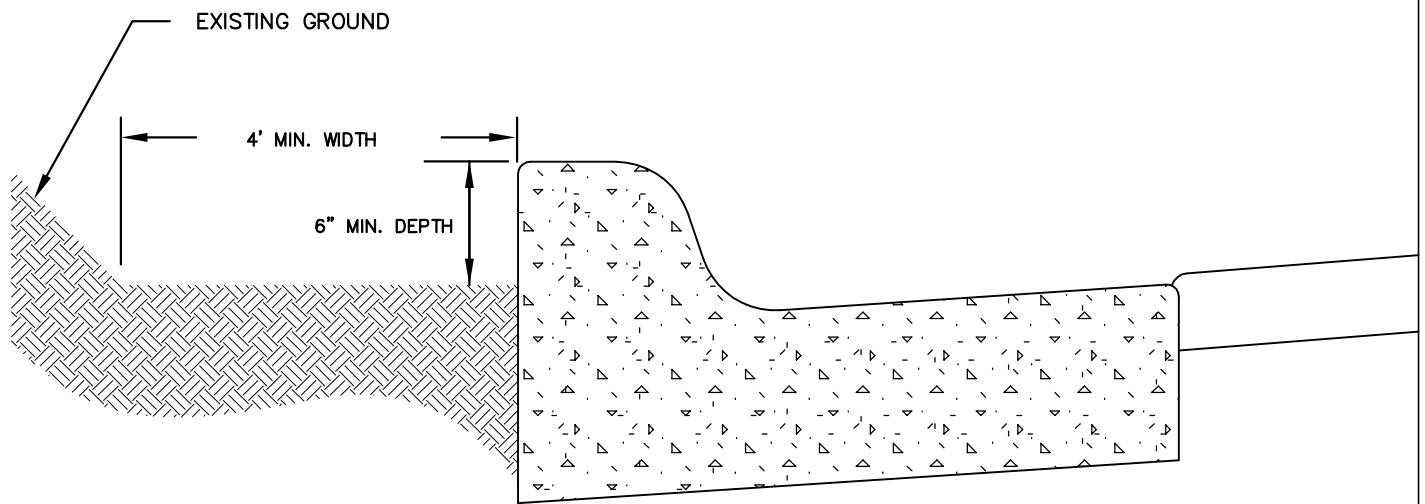
NOTE:

DIRECT THE OUTLET SIDE OF THE ROCK FILTER BERM/DAMS ONTO A STABILIZED AREA, SUCH AS VEGETATION AND OR ROCK.

EMBED A MIN. OF 4" INTO THE EXISTING GROUND/EMBANKMENT.

USE 3:1 OR FLATTER SIDE SLOPES.

WITHIN THE SAFETY CLEAR ZONE. USE 6:1 OR FLATTER SIDE SLOPES.



NOTES:

BOULEVARD CUTTING IS REQUIRED ON ALL CONSTRUCTION JOBS IN THE CITY OF MAPLE GROVE WHERE THE CONTRACTOR WILL BE DISTURBING THE EXISTING TERRAIN AND MORE THEN 3 DAYS UNTIL FINAL STABILIZATION.

CONTRACTOR IS RESPONSIBLE FOR CLEANING OUT ANY SEDIMENT FROM THE BOULEVARD CUT AREA. THIS MAYBE MULTIPLE TIMES AS DIRECTED BY THE ENGINEER.



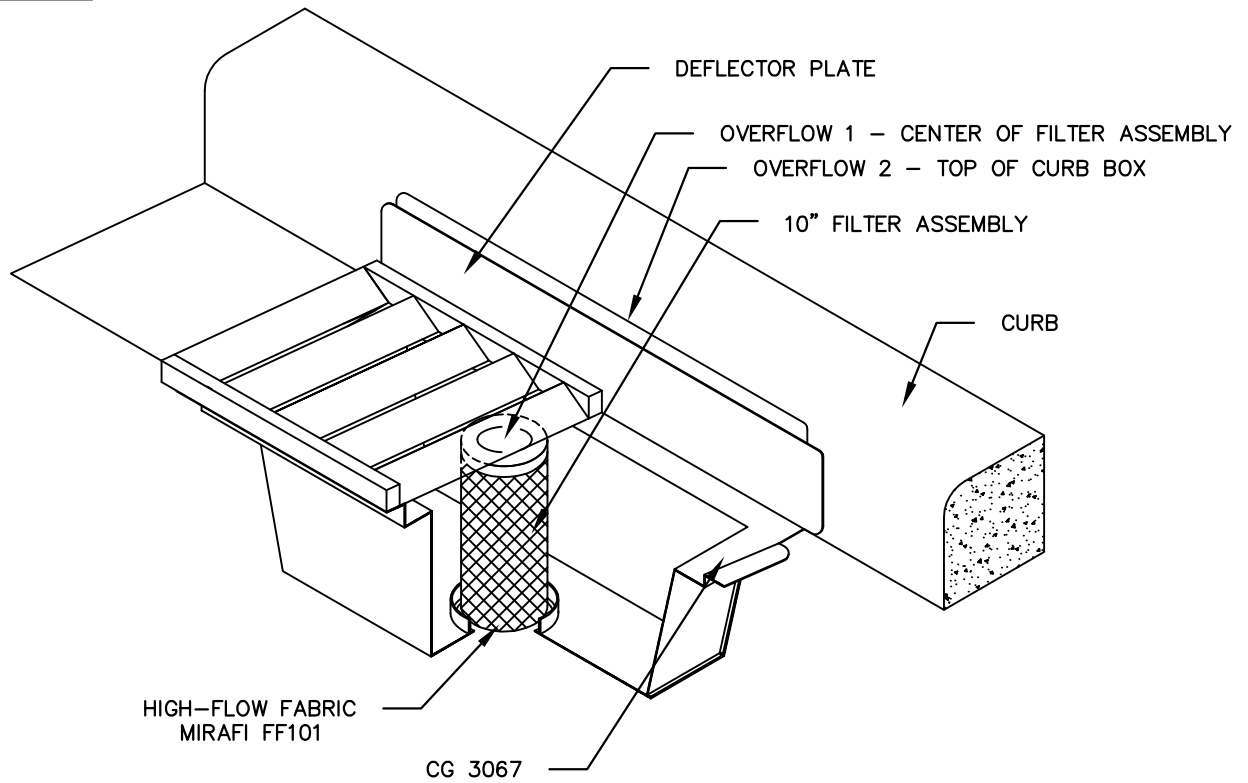
LAST REVISION
NOVEMBER 2014

BOULEVARD CUT

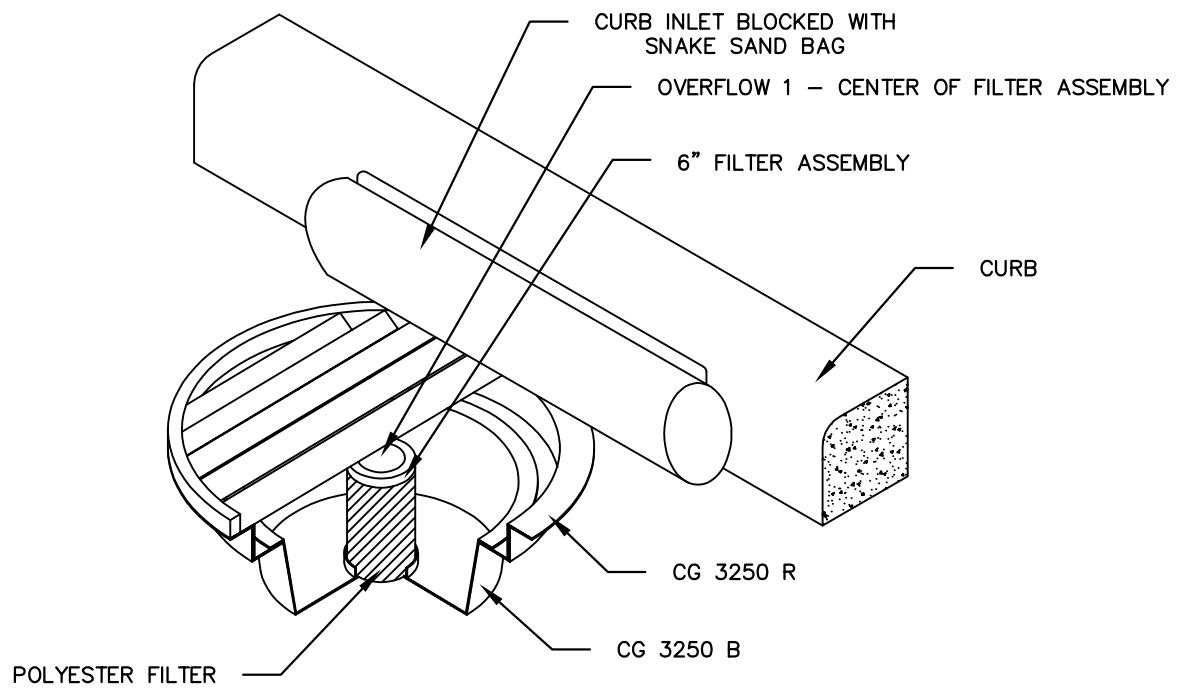
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

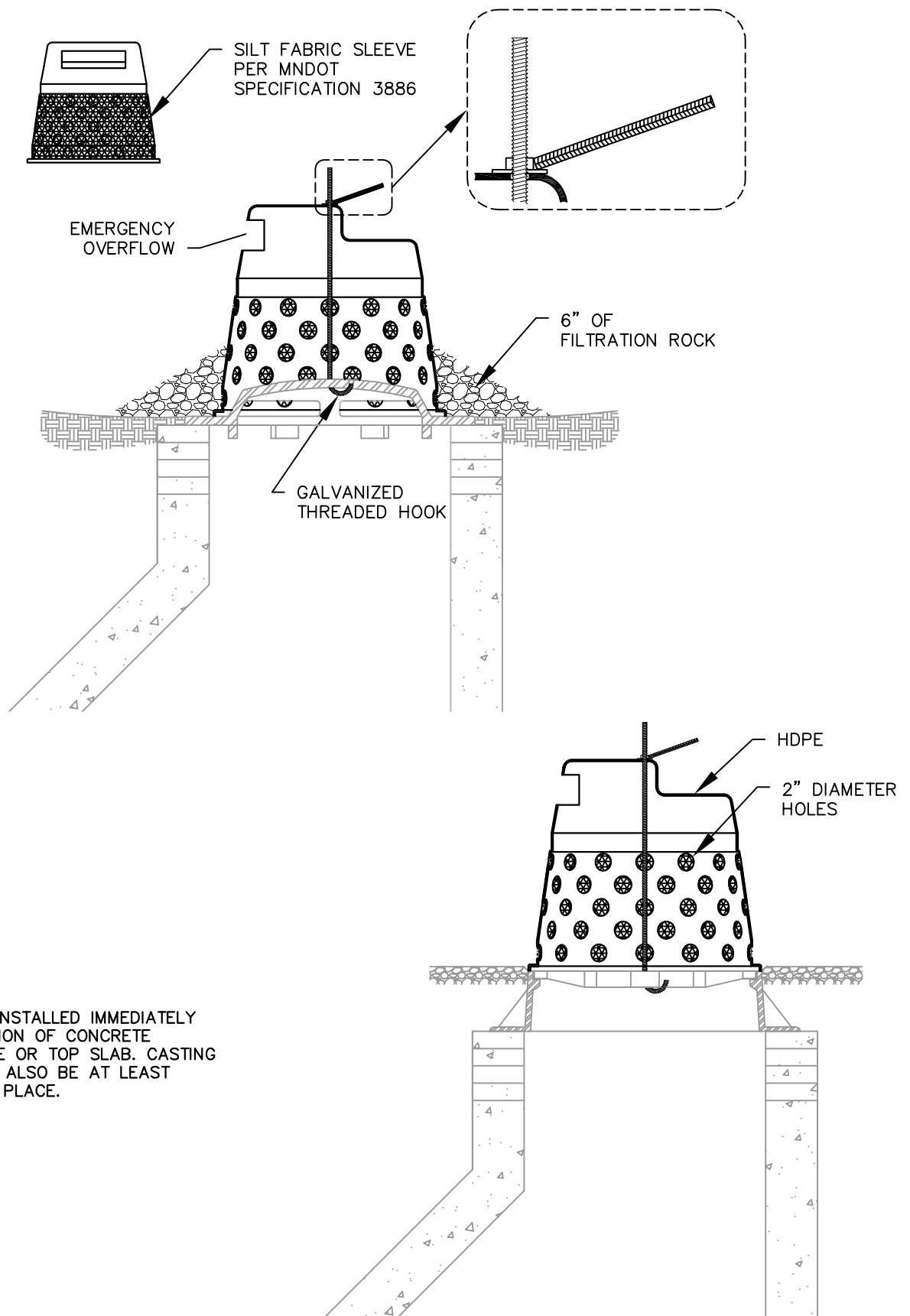
STANDARD
PLATE #
EROS-18

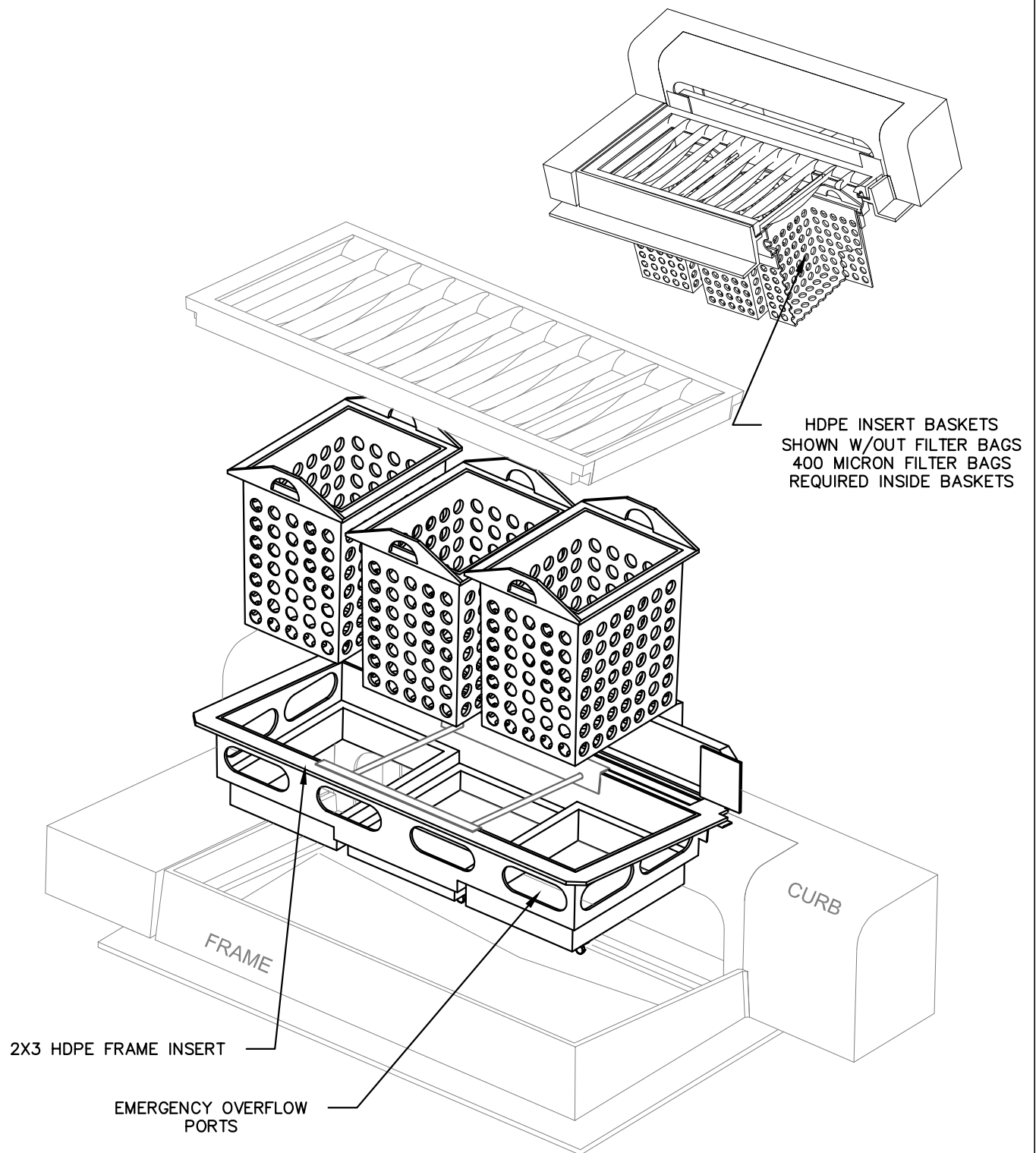
WIMCO ROAD DRAIN OR
APPROVED EQUAL



WIMCO ROAD DRAIN OR
APPROVED EQUAL







MANUFACTURED BY ROYAL ENVIRONMENTAL SYSTEMS

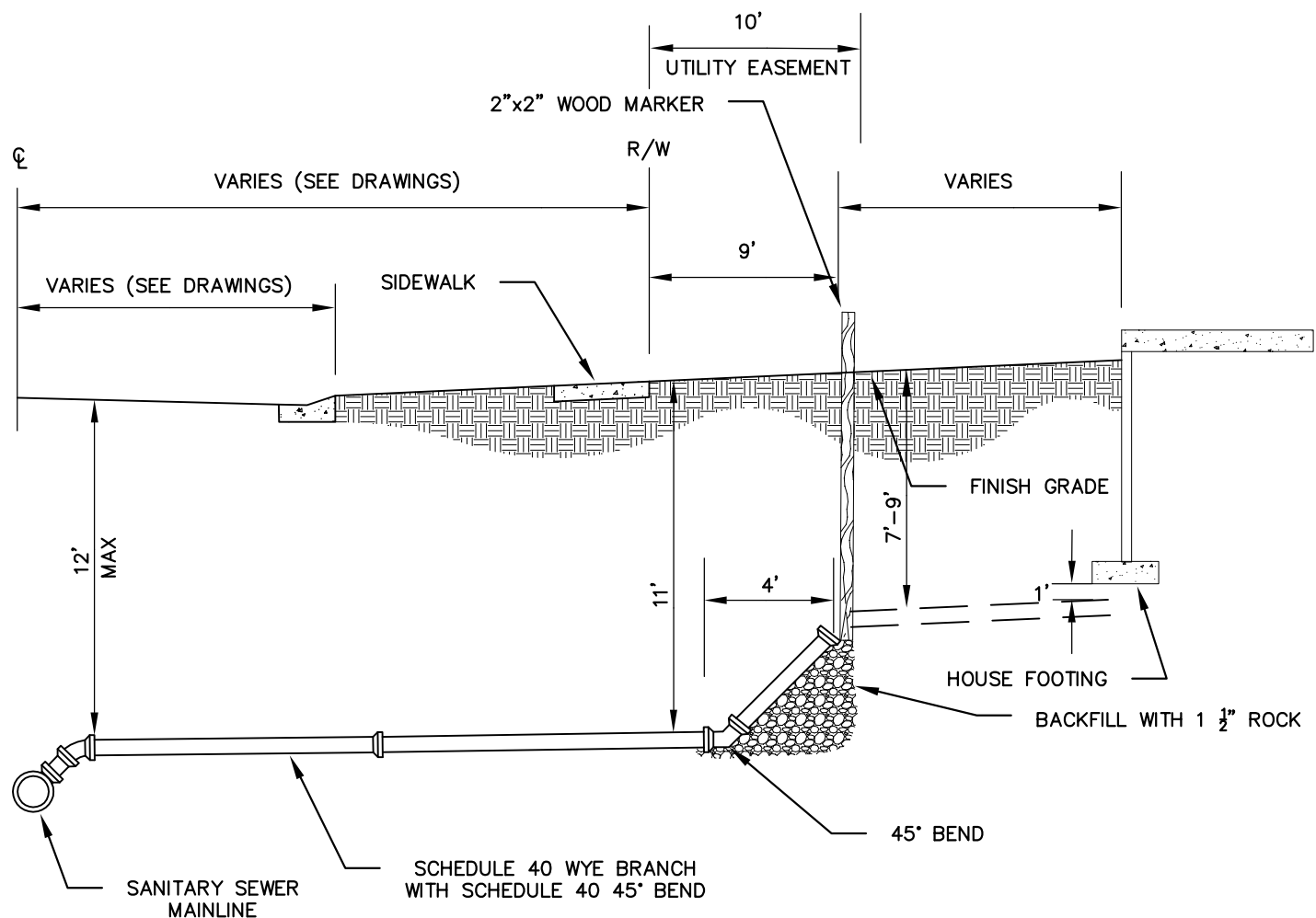


LAST REVISION
NOVEMBER 2014

INFRA SAFE - 2'X3' DEBRIS COLLECTION DEVICE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
EROS-21



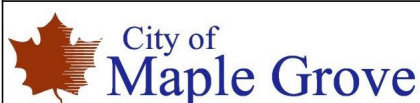
NOTES:

SEWER SERVICE, PVC SCHEDULE 40 4" OR 6" AS SPECIFIED

2% MINIMUM SLOPE OR 12% MAXIMUM SLOPE, 1/4" PER FOOT

ALL PIPE SHALL BEDDED IN GRANULAR BORROW 3149 B.1 OR COURSE FILTER AGGREGATE 3149H

END OF SERVICE SHALL BE 7' TO 9' DEEP AT END OF SERVICE. THE END SHALL BE A FACTORY JOINT WITH PLUG, USING A FACTORY MANUFACTURED ADAPTOR WHERE NECESSARY

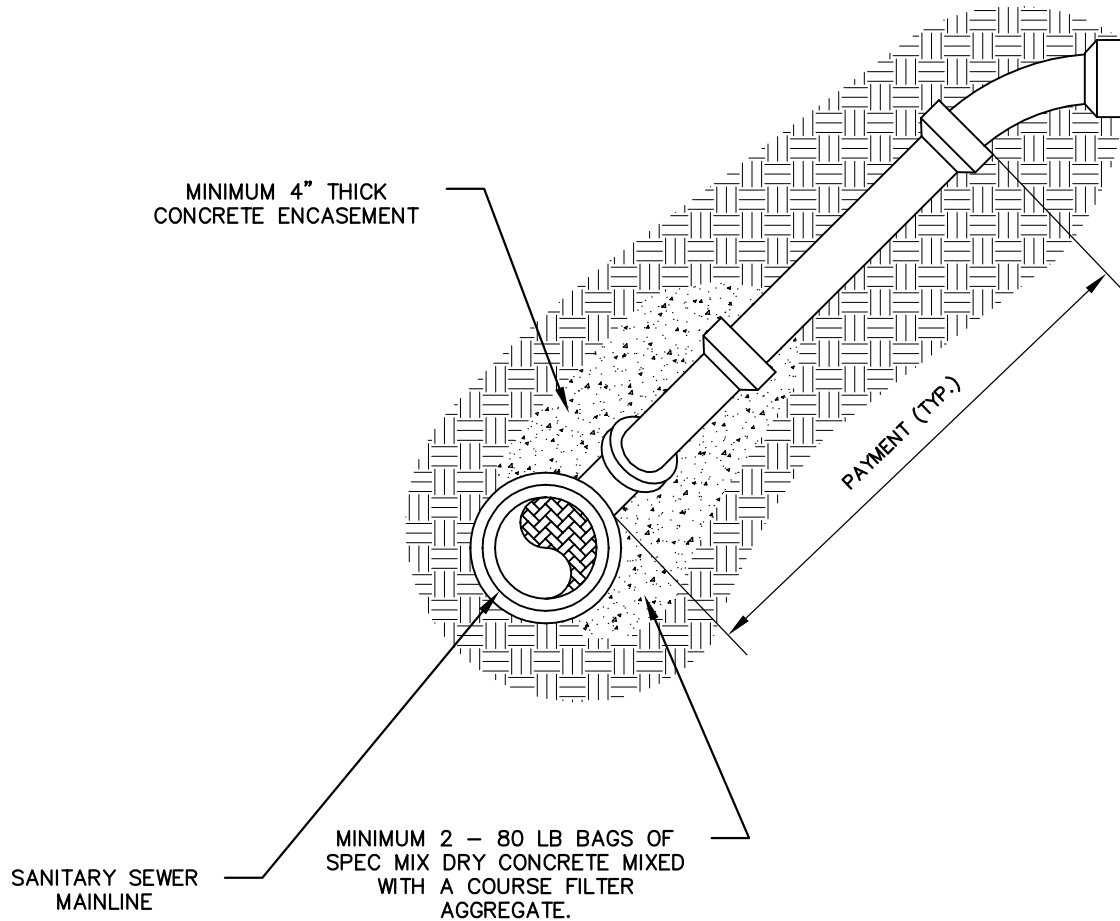


LAST REVISION
NOVEMBER 2014

SANITARY SEWER SERVICE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-1



NOTES:

SERVICE CONNECTION TO BE AT 2:00 OR 10:00 WITH APPROVED FACTORY INSTALLED SCHEDULE 40 WYE.

4" OR 6" SANITARY SEWER SERVICE RISER SUPPORT ON TRENCH SLOPE 1:1 MAX

SCHEDULE 40 PVC SERVICES

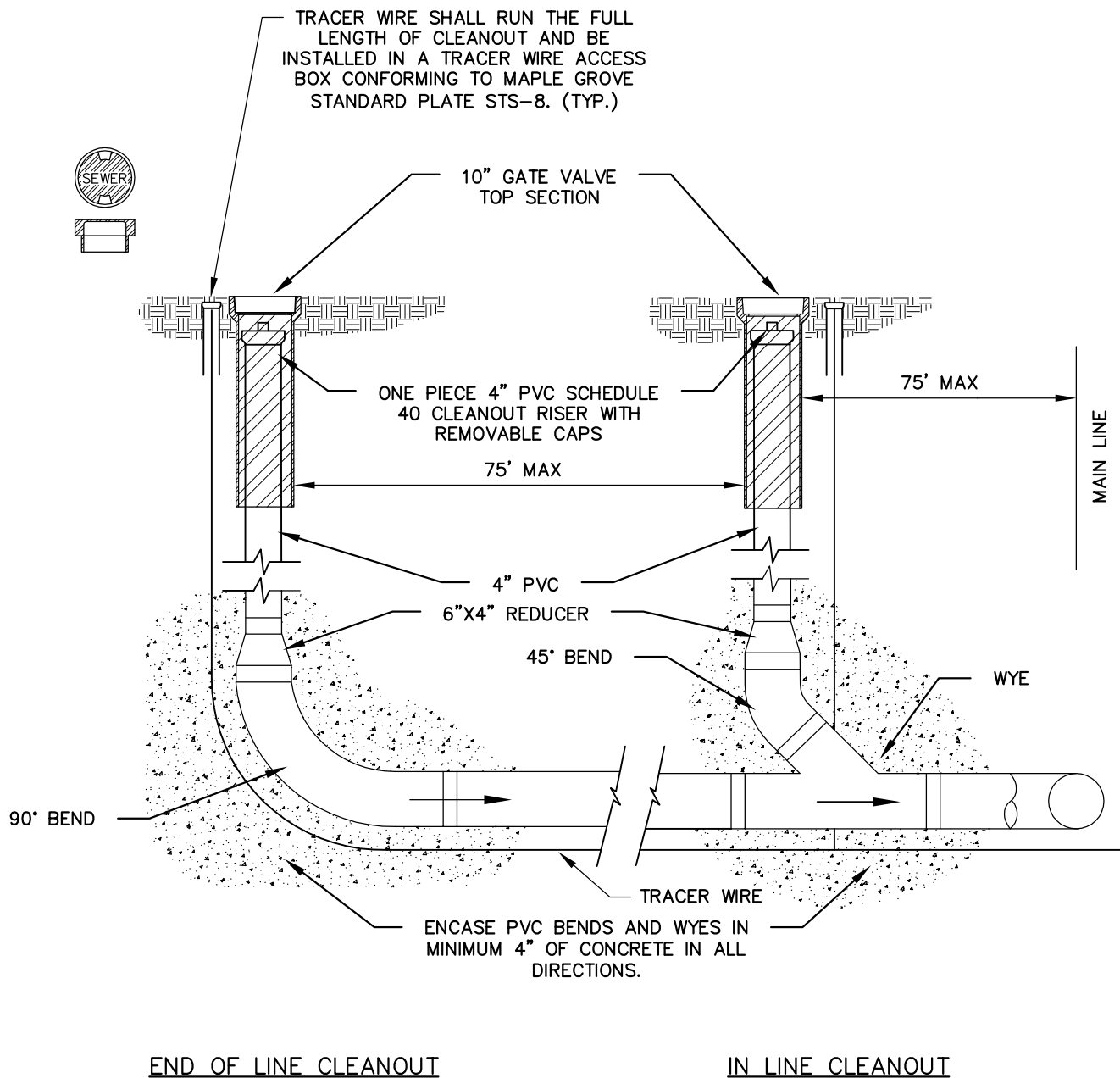


LAST REVISION
NOVEMBER 2014

SANITARY SEWER SERVICE RISER

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-2



NOTES:

10" GATE VALVE BOX TOP SECTION WITH DROP LID (SEWER) SHALL BE INSTALLED WITH ALL CLEANOUTS. 1" BELOW FINISHED GRADE.

4" PVC SCHEDULE 40 CLEANOUT RISER WITH REMOVABLE CAP 4"-6" BELOW FINISH GRADE.

ENCLOSE LONG SWEEP BEND OR COMBINATION WYE IN 4" CONCRETE AS SHOWN

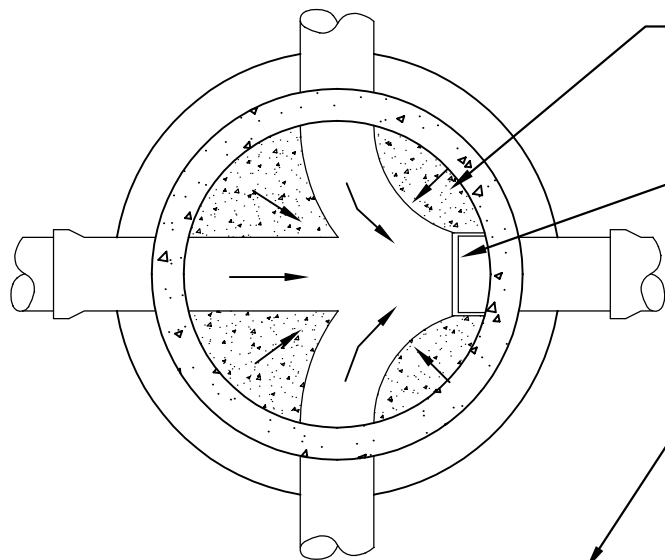


LAST REVISION
NOVEMBER 2014

SANITARY SEWER CLEANOUT

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-3



PLAN

PRECAST INVERT MUST BE $\frac{1}{2}$ DIAMETER OF PIPE AND BRANCHES SHOULD BE SLOPED 2" TOWARD INVERT. MATCH 0.8THS POINT OF MAIN LINE SEWER AND LATERAL BRANCH

MANHOLE STEPS SHALL BE PLACED SO THAT OFFSET VERTICAL PORTION OF CONE IS FACING DOWNSTREAM

ADJUST MANHOLE FRAME AND CASTING TO CITY OF MAPLE GROVE STANDARD PLATE STS-1

NEENAH MANHOLE FRAME AND CASTING R-1642, SELF SEALING B LID, WITH SOLID COVER AND TWO CONCEALED PICK HOLES OR APPROVED EQUAL. LID SHALL BE LABELED "SANITARY SEWER" WITH 2" RAISED LETTERS

CONCRETE ADJUSTMENT RINGS SHALL BE SEALED TO THE CONE, CASTING, AND ONE ANOTHER BY USING A PREPACKAGED MOTOR MIX. TOTAL ADJUSTMENT MINIMUM 4" MAX 14".

PRECAST ECCENTRIC CONE SECTION & RISER SECTIONS AS CONFORMING TO ASTM C478

MANHOLE STEPS, NEENAH R-1981-N OR APPROVED EQUAL, 16" ON CENTER. COPOLYMER POLYPROPYLENE PLASTIC (PSI-PF) AND ALUMINUM STEPS APPROVED.

JOINTS BETWEEN PRECAST SECTIONS SHALL USE PRELUBRICATED PROFILE GASKETS CONFORMING TO ASTM C443.

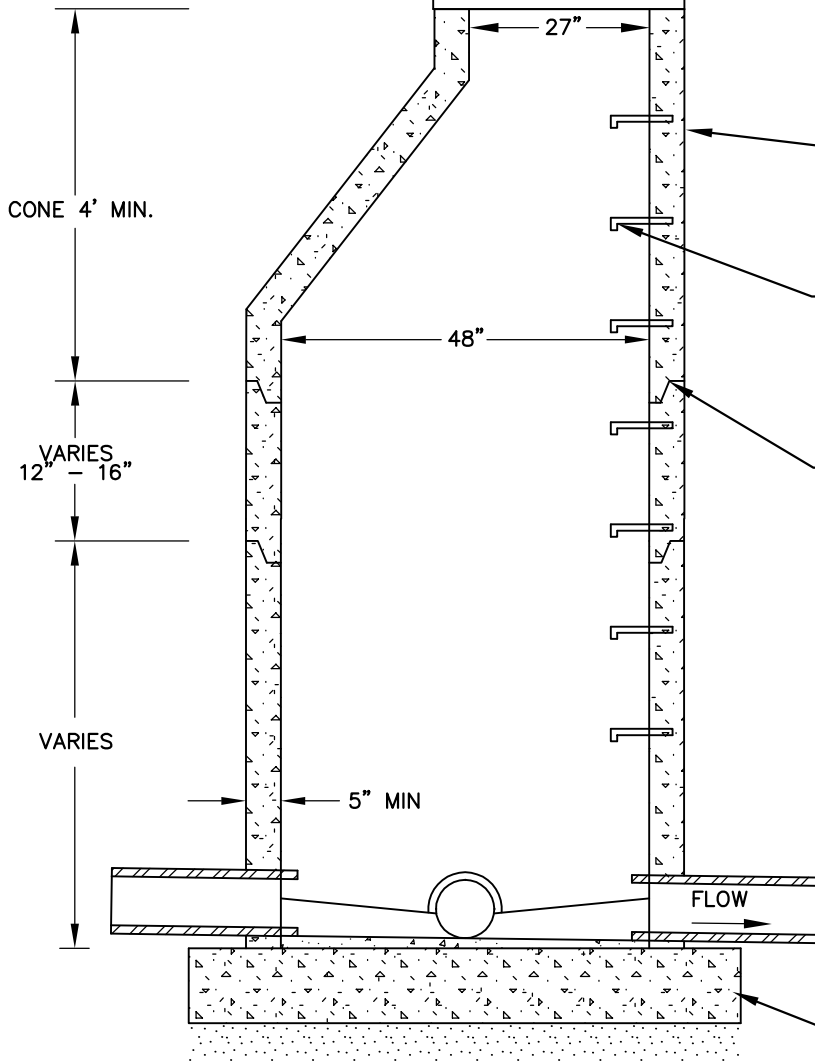
NOTES:

ALL WATER TIGHT PIPE CONNECTIONS SHALL CONFORM TO ASTM C923 FOR CONNECTIONS BETWEEN MAINTENANCE HOLE STRUCTURES AND PIPES.

POSITIVE MECHANICAL SEALS SHALL BE KOR-N-SEAL FOR PIPES 24" AND SMALLER. GREATER THAN 24" SHALL BE A-LOK X-CEL.

ALL DOG HOUSES SHALL BE GROUTED ON BOTH INSIDE AND OUTSIDE

MINIMUM THICKNESS OF PRECAST BASE IS 6" FOR 14' DEEP OR LESS, AND INCREASES 1" IN THICKNESS FOR EVERY 4' OF DEPTH GREATER THAN 14'.



SECTION



LAST REVISION
NOVEMBER 2014

STANDARD SANITARY MANHOLE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-4

SPECIFICATIONS AND STANDARDS

AISC MANUAL OF STEEL CONSTRUCTION, 9TH EDITION

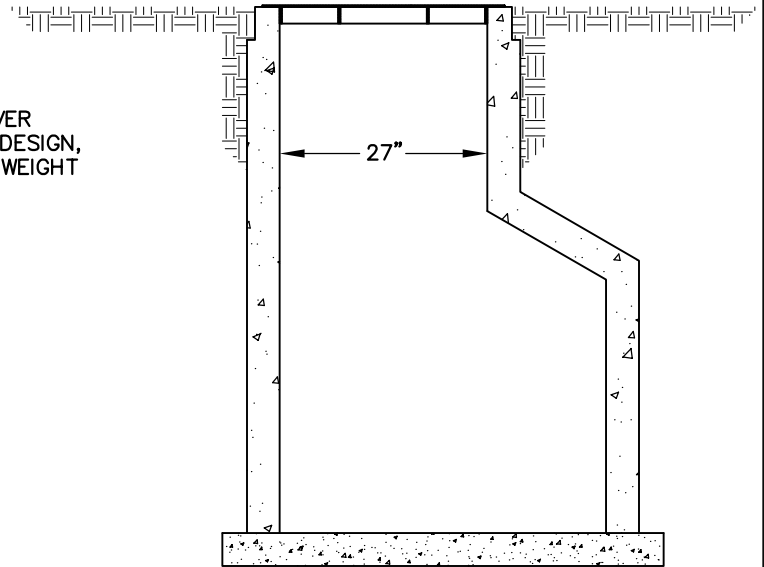
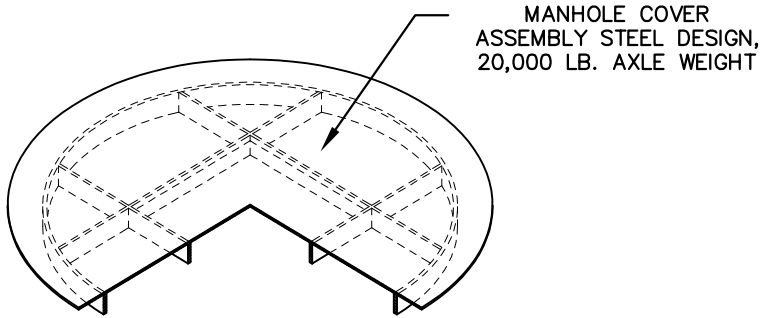
AWS STRUCTURAL WELDING CODE – STEEL, D1.1–94

29 CFR 1926 – OSHA SAFETY AND HEALTH STANDARDS

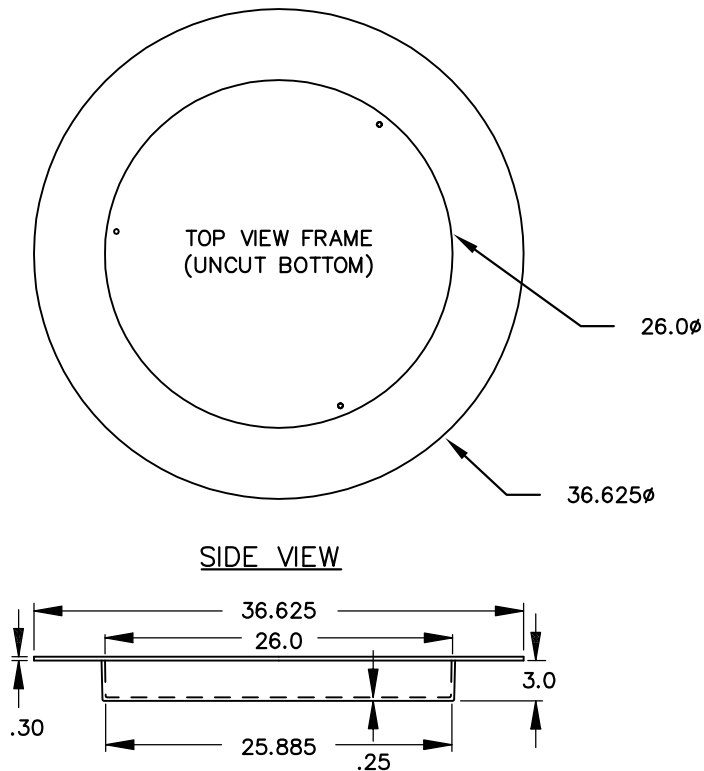
DESIGN LOADS

ALLOWABLE AXLE WEIGHT LOAD – 20,000 LBS

SAFETY FACTOR – 2:1



WIMCO, LLC
SP-27 SANITARY PROTECTIVE COVER



NOTES:

UNCUT FRAME CAN BE UTILIZED IN CONJUNCTION WITH STEEL PLATE ON CONSTRUCTION SITES TO TRAP SEDIMENTS, KEEPING MANHOLES AND PIPELINES FREE OF DEBRIS.

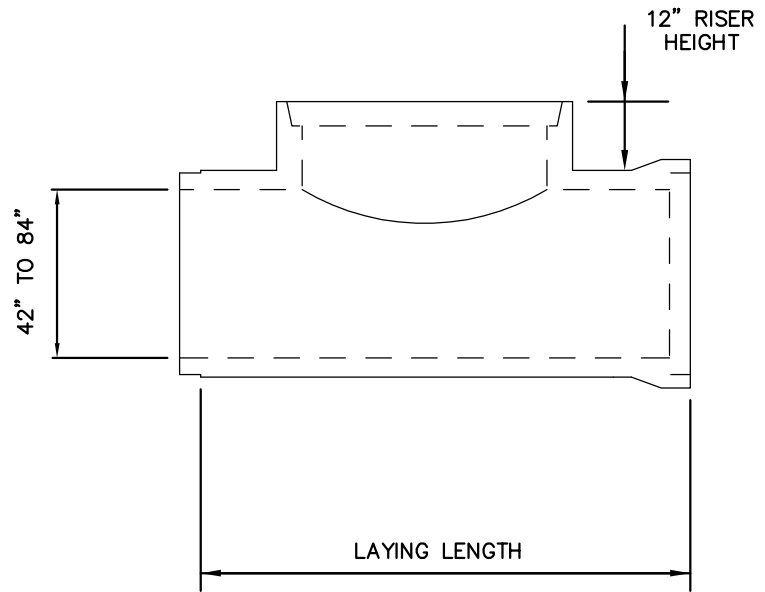
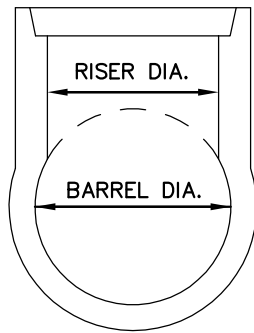


LAST REVISION
NOVEMBER 2014

27" MANHOLE PROTECTIVE COVER

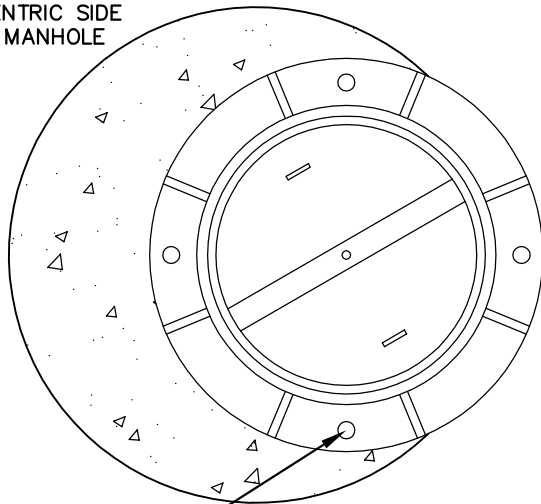
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-5



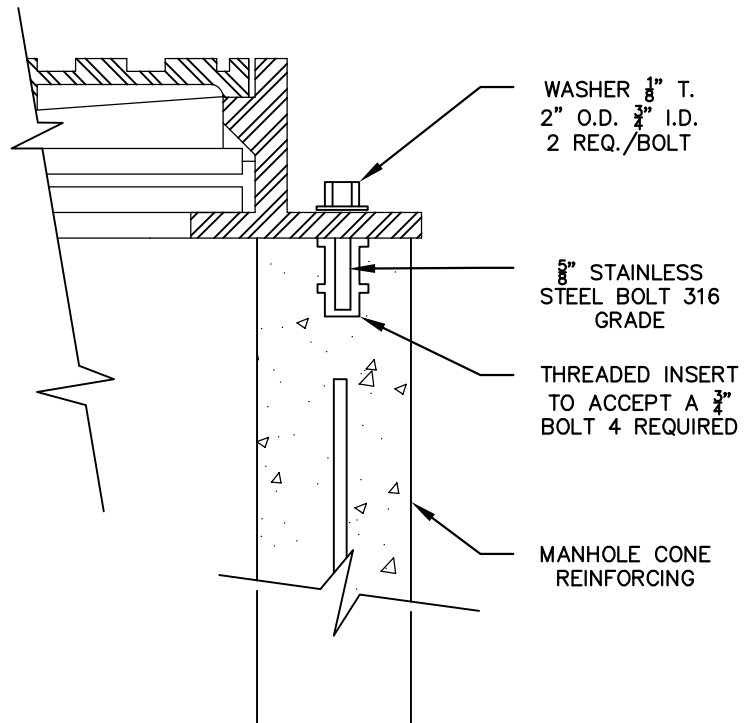
DIAMETER OF RISER INCHES	DIAMETER OF BARREL INCHES
48	42
48	48
48	54
48	60
48	66
48	72
48	78
48	84

ECCESTRIC SIDE
OF MANHOLE



4 - 1" DIAMETER
HOLES IN MANHOLE
FRAME EVENLY
SPACED

PLAN VIEW
TOP COVER REMOVED



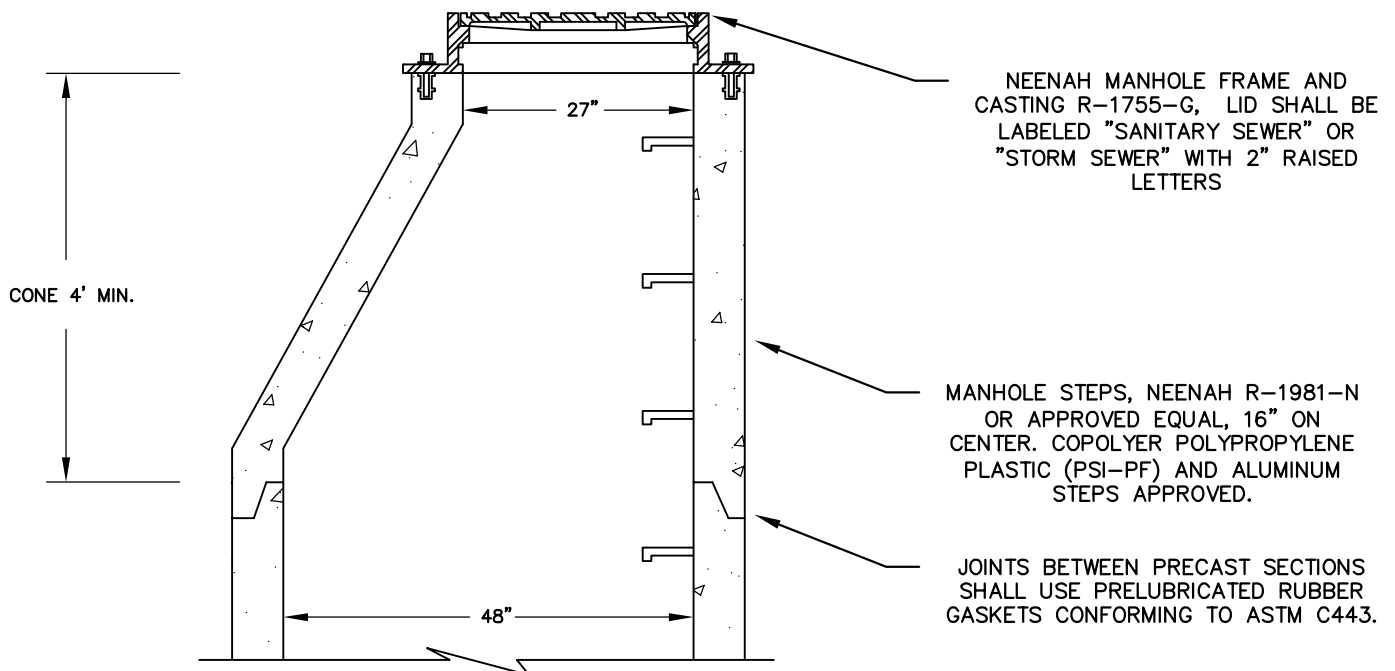
WASHER $\frac{1}{8}$ " T.
2" O.D. $\frac{3}{4}$ " I.D.
2 REQ./BOLT

$\frac{5}{8}$ " STAINLESS
STEEL BOLT 316
GRADE

THREADED INSERT
TO ACCEPT A $\frac{3}{4}$ "
BOLT 4 REQUIRED

MANHOLE CONE
REINFORCING

TIE DOWN DETAIL



CONE 4' MIN.

NEENAH MANHOLE FRAME AND
CASTING R-1755-G, LID SHALL BE
LABELED "SANITARY SEWER" OR
"STORM SEWER" WITH 2" RAISED
LETTERS

MANHOLE STEPS, NEENAH R-1981-N
OR APPROVED EQUAL, 16" ON
CENTER. COPOLYMER POLYPROPYLENE
PLASTIC (PSI-PF) AND ALUMINUM
STEPS APPROVED.

JOINTS BETWEEN PRECAST SECTIONS
SHALL USE PRELUBRICATED RUBBER
GASKETS CONFORMING TO ASTM C443.

ECCESTRIC
WATERTIGHT MANHOLE

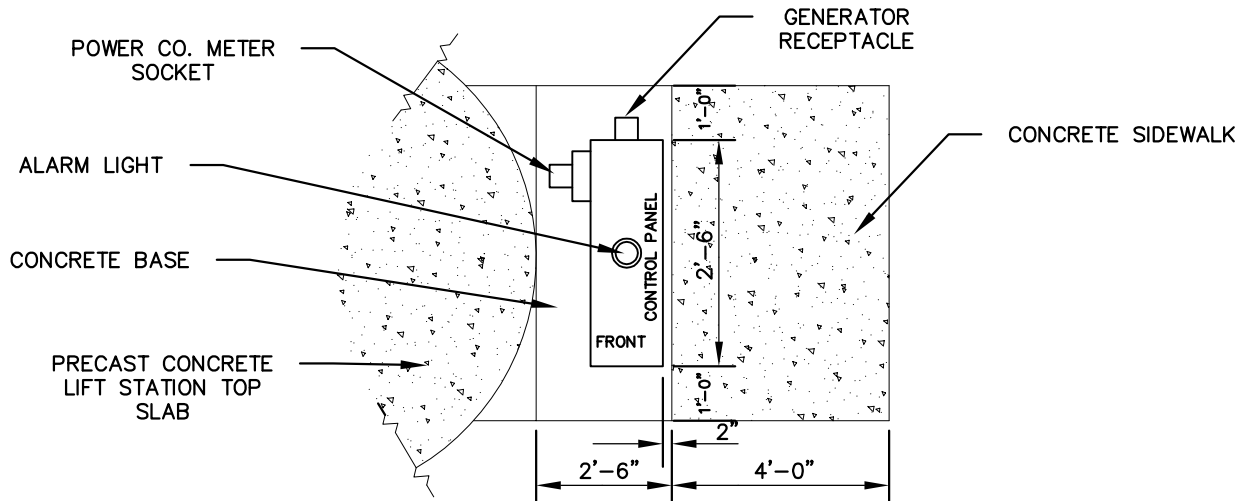


LAST REVISION
NOVEMBER 2014

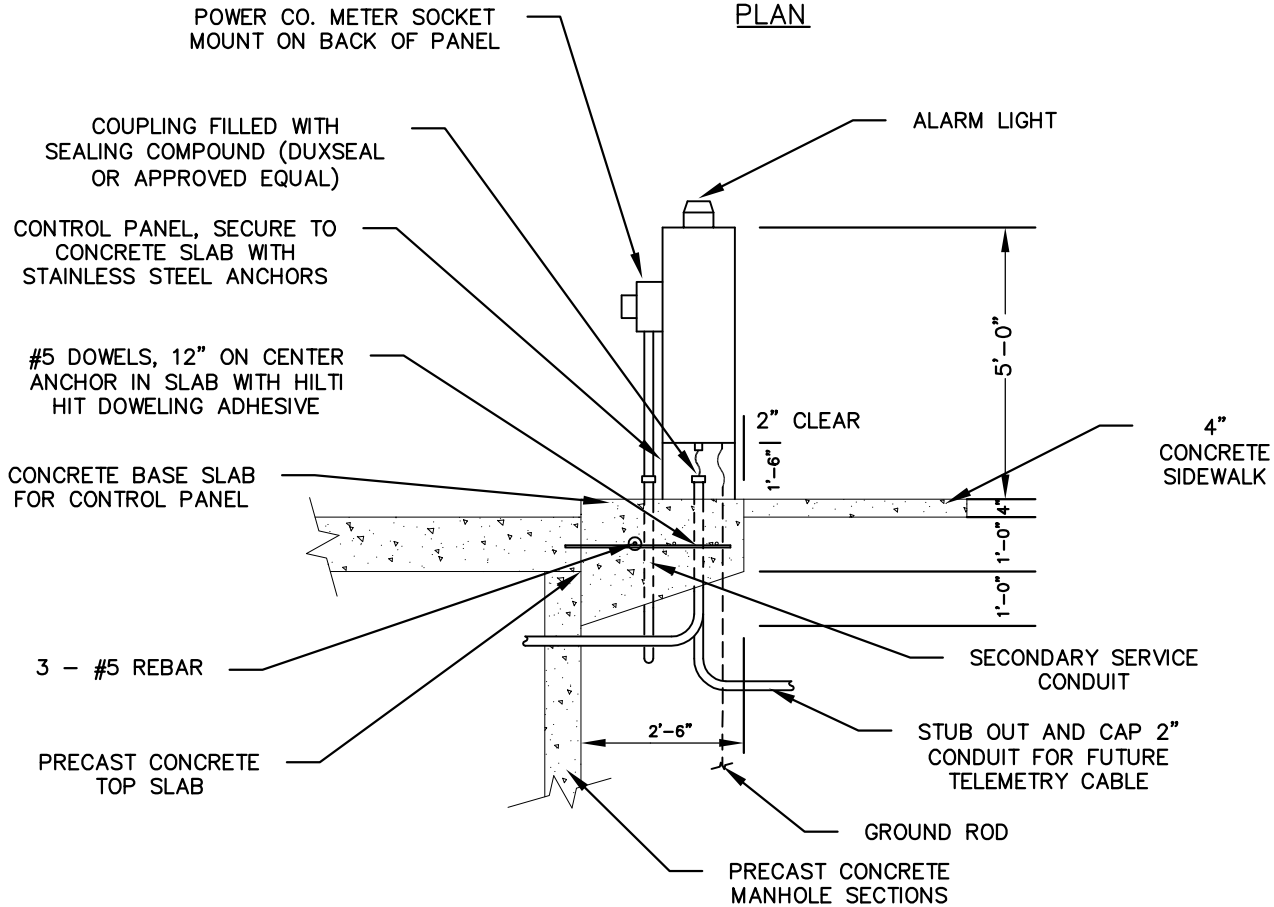
WATERTIGHT MANHOLE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-7



PLAN



SECTION

NOTES:

FINAL DESIGN OF SERVICE PANEL TO BE REVIEWED AND APPROVED BEFORE PRODUCTION BY THE CITY OF MAPLE GROVE.

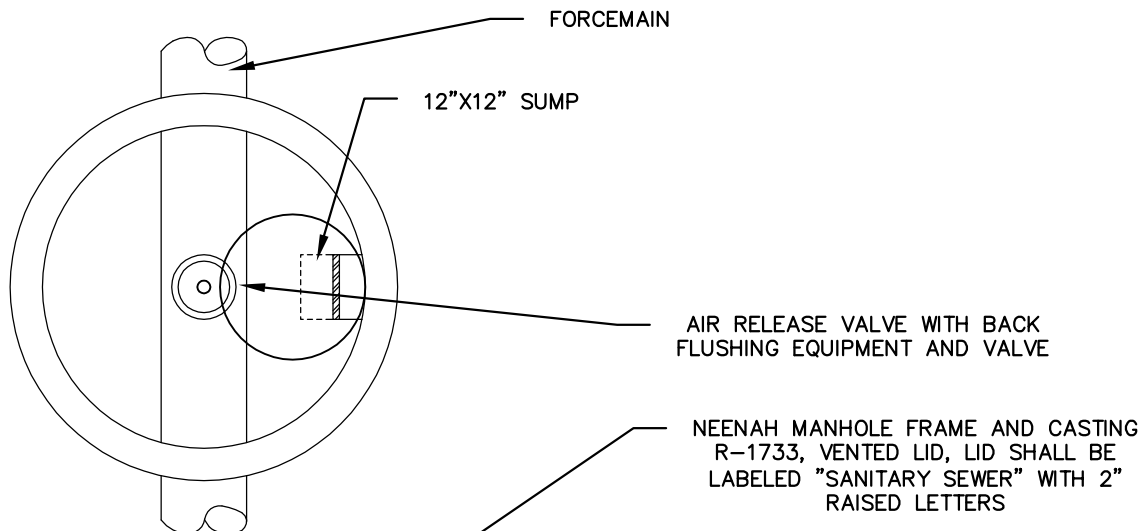


LAST REVISION
NOVEMBER 2014

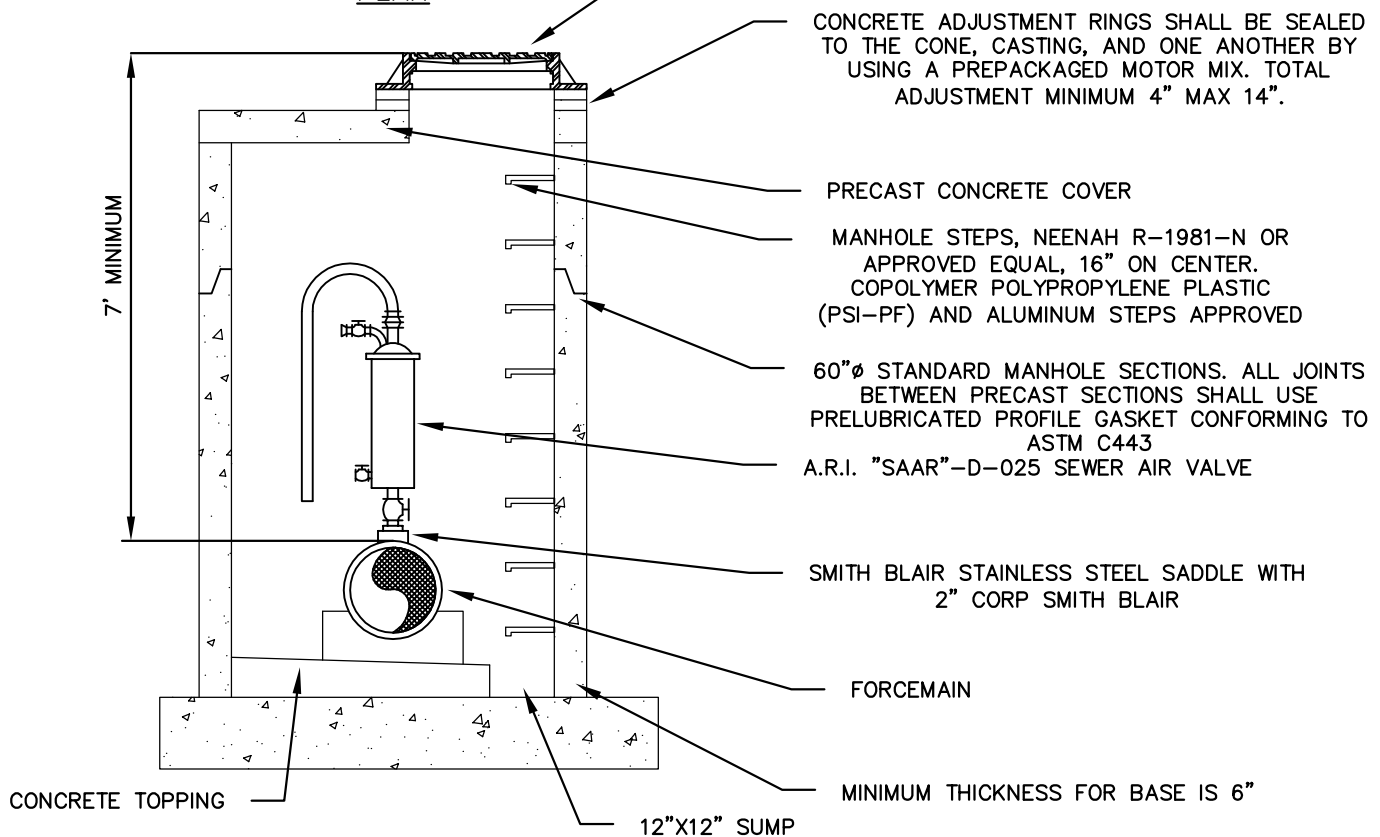
SERVICE PANEL

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-8



PLAN



SECTION



LAST REVISION
NOVEMBER 2014

SANITARY SEWER AIR RELEASE MANHOLE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-9

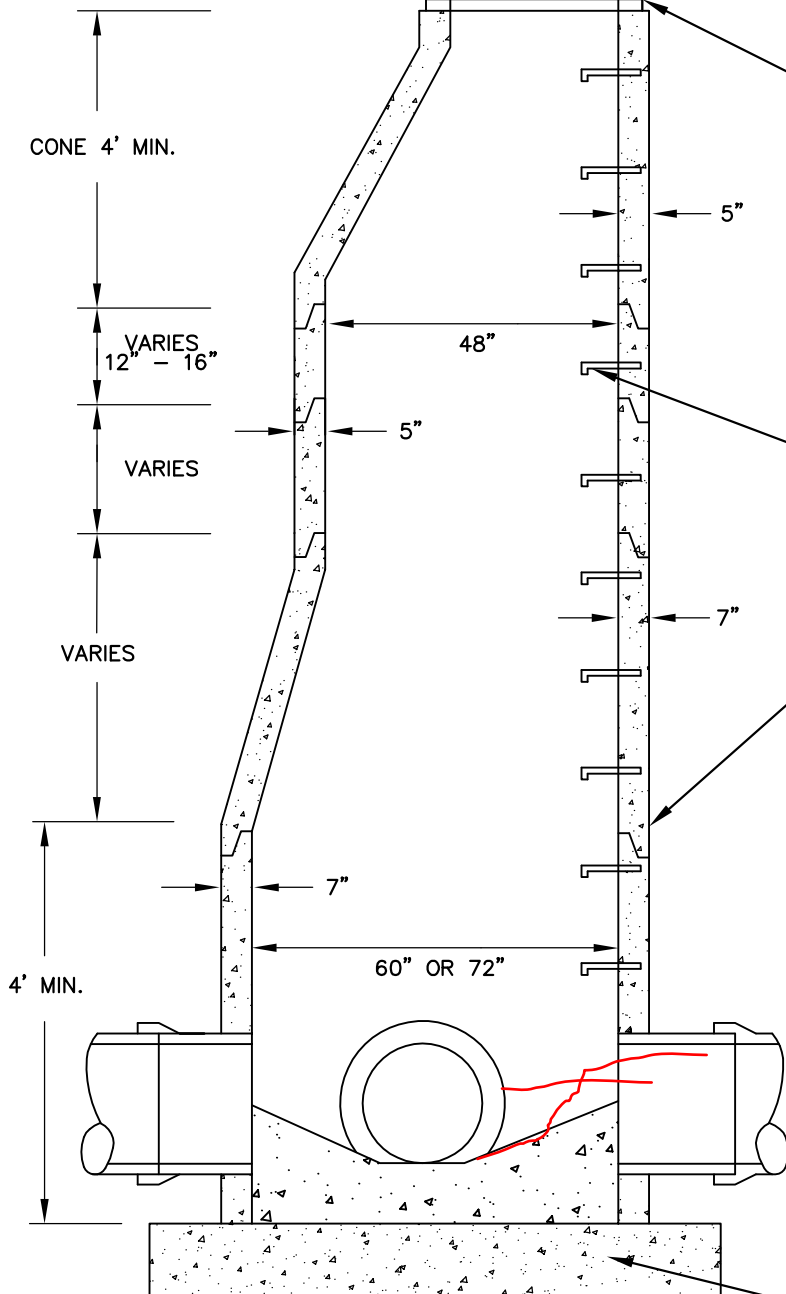
NEENAH MANHOLE FRAME AND CASTING R-1642, SELF SEALING B LID, WITH SOLID COVER AND TWO CONCEALED PICK HOLES OR APPROVED EQUAL. LID SHALL BE LABELED "SANITARY SEWER" WITH 2" RAISED LETTERS

CONCRETE ADJUSTMENT RINGS SHALL BE SEALED TO THE CONE, CASTING, AND ONE ANOTHER BY USING A PREPACKAGED MOTOR MIX. TOTAL ADJUSTMENT MINIMUM 4" MAX 14".

MANHOLE STEPS, NEENAH R-1981-N OR APPROVED EQUAL, 16" ON CENTER. COPOLYMER POLYPROPYLENE PLASTIC (PSI-PF) AND ALUMINUM STEPS APPROVED.

JOINTS BETWEEN PRECAST SECTIONS SHALL USE PRELUBRICATED PROFILE RUBBER GASKETS CONFORMING TO ASTM C443.

MINIMUM SLAB THICKNESS IS 6" FOR 14' DEPTH. INCREASE THICKNESS 1" FOR EVERY 4' OF DEPTH GREATER THAN 14'



SECTION

NOTES:

ALL WATER TIGHT PIPE CONNECTIONS SHALL CONFORM TO ASTM C923 FOR CONNECTIONS BETWEEN MAINTENANCE HOLE STRUCTURES AND PIPES.

POSITIVE MECHANICAL SEALS SHALL BE KOR-N-SEAL FOR PIPES 24" AND SMALLER. GREATER THAN 24" SHALL BE A-LOK X-CEL.

PRECAST INVERT SHOULD BE $\frac{1}{2}$ ϕ OF PIPE SLOPED 2" TOWARD INVERT



LAST REVISION
NOVEMBER 2014

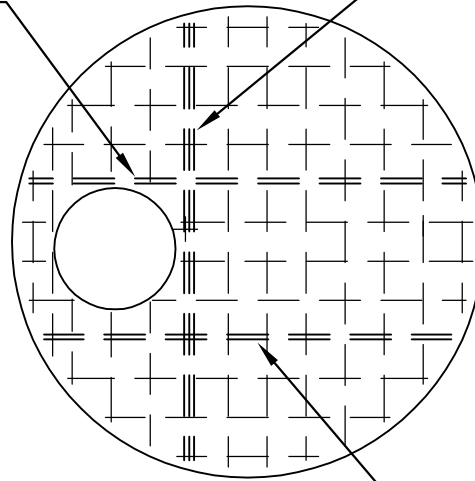
REDUCING MANHOLE 78" TO 48" OR 60" TO 48"

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

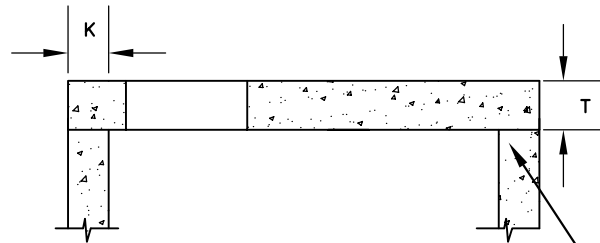
STANDARD
PLATE #
SS-10

ONE EXTRA BAR IN BOTTOM

TWO EXTRA BARS IN BOTTOM



ONE EXTRA BAR IN BOTTOM

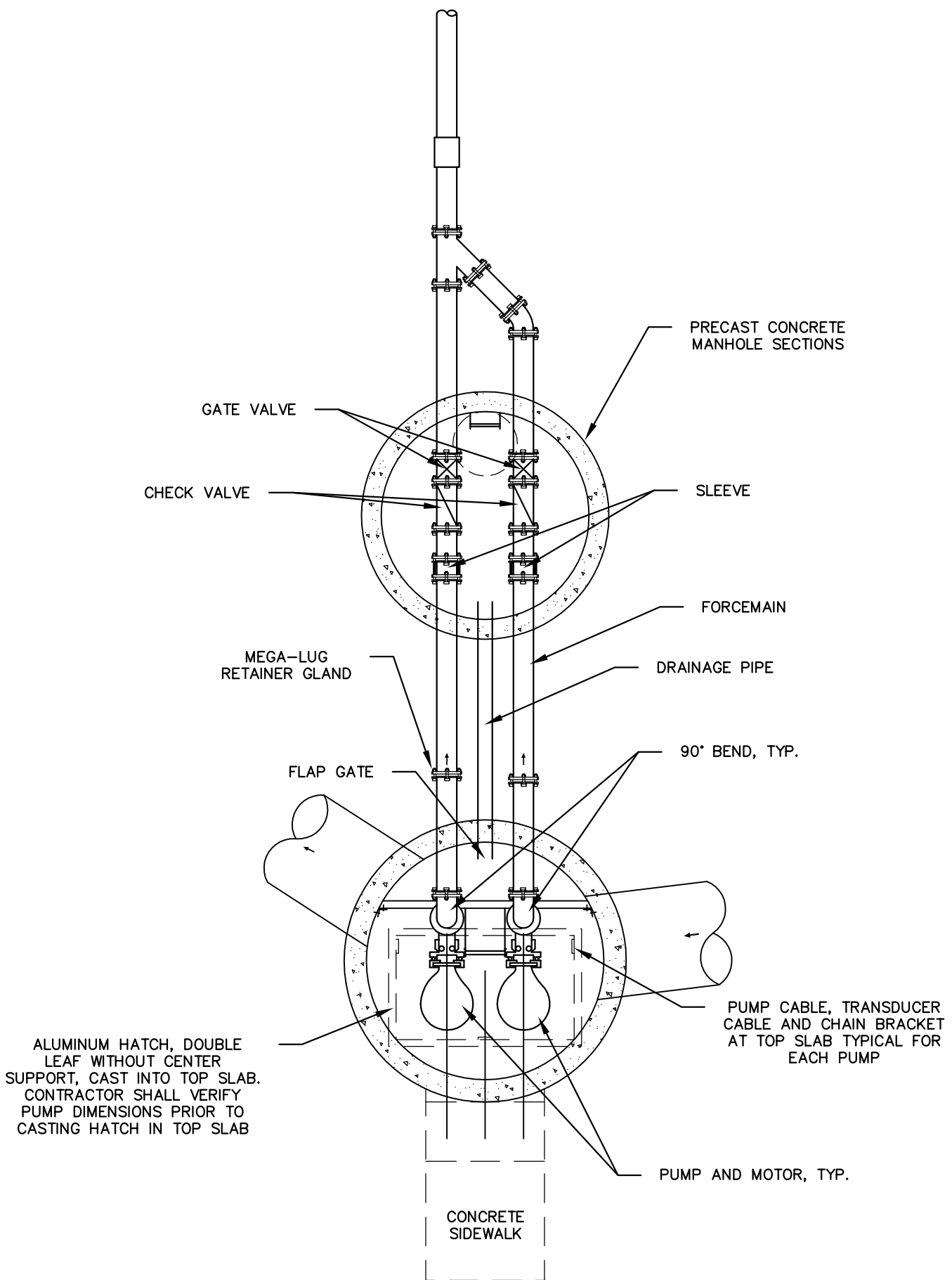


JOINTS BETWEEN PRECAST
SECTIONS SHALL USE
PRELUBRICATED PROFILE
RUBBER GASKETS
CONFORMING TO ASTM C443.

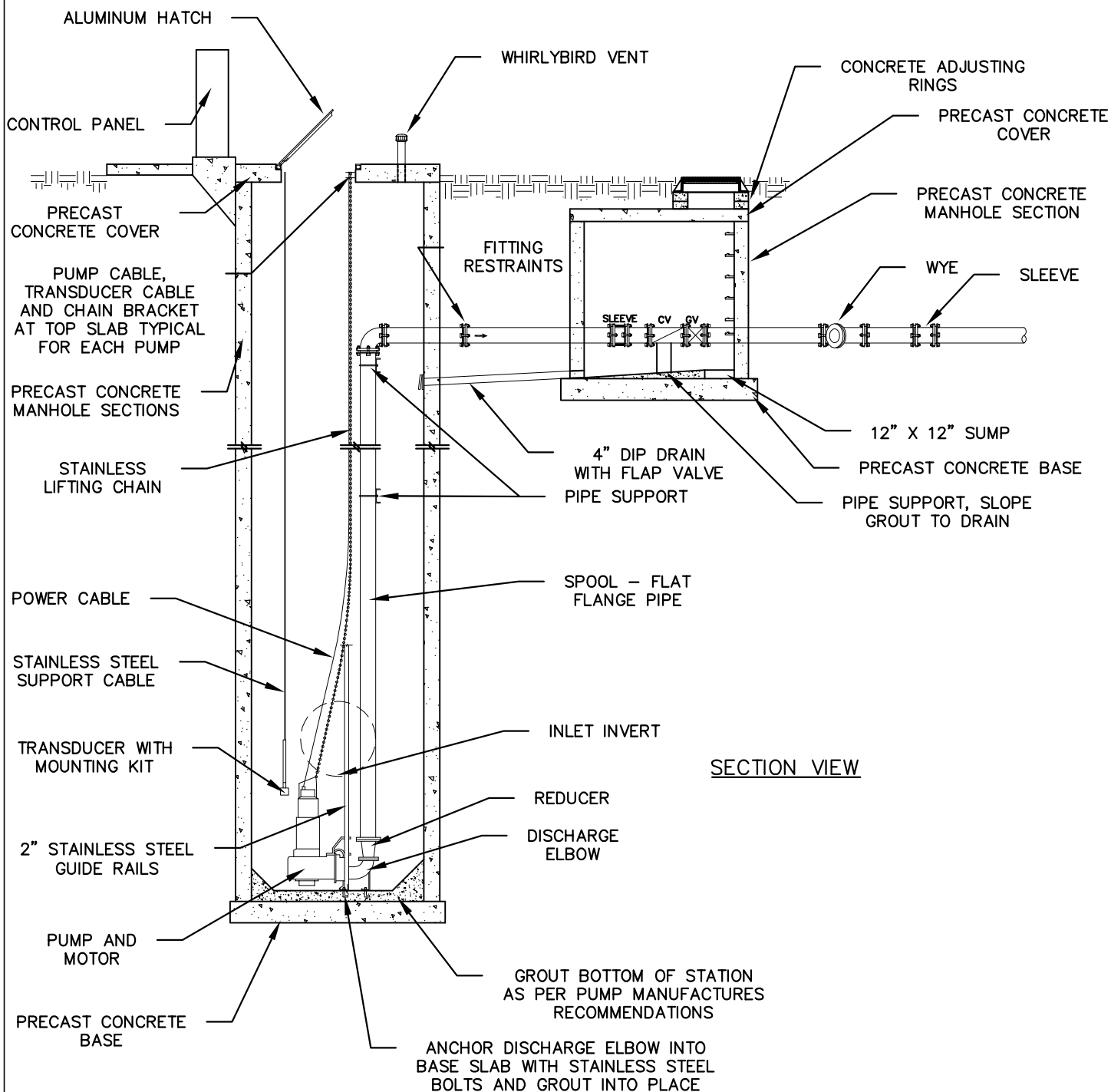
COVER REQUIREMENTS

COVER DIAMETER	T	K	BOTTOM BARS	TOP BARS
56"	6"	6"	NO. 5 - 6"	X
65"	8"	6"	NO. 5 - 6"	X
72"	8"	7"	NO. 5 - 4"	NO. 3 - 6"
79"	8"	7"	NO. 5 - 4"	NO. 3 - 6"
85"	8"	8"	NO. 5 - 4"	NO. 3 - 6"
93"	8"	8"	NO. 5 - 4"	NO. 5 - 4"
100"	8"	9"	NO. 5 - 4"	NO. 5 - 4"
106"	8"	9"	NO. 5 - 4"	NO. 5 - 4"
113"	8"	9"	NO. 5 - 4"	NO. 5 - 4"
119"	8"	9"	NO. 5 - 4"	NO. 5 - 4"

1" MINIMUM COVER ON REBAR



MINIMUM LIFT STATION AND VALVE MANHOLE PLAN VIEW REQUIREMENTS

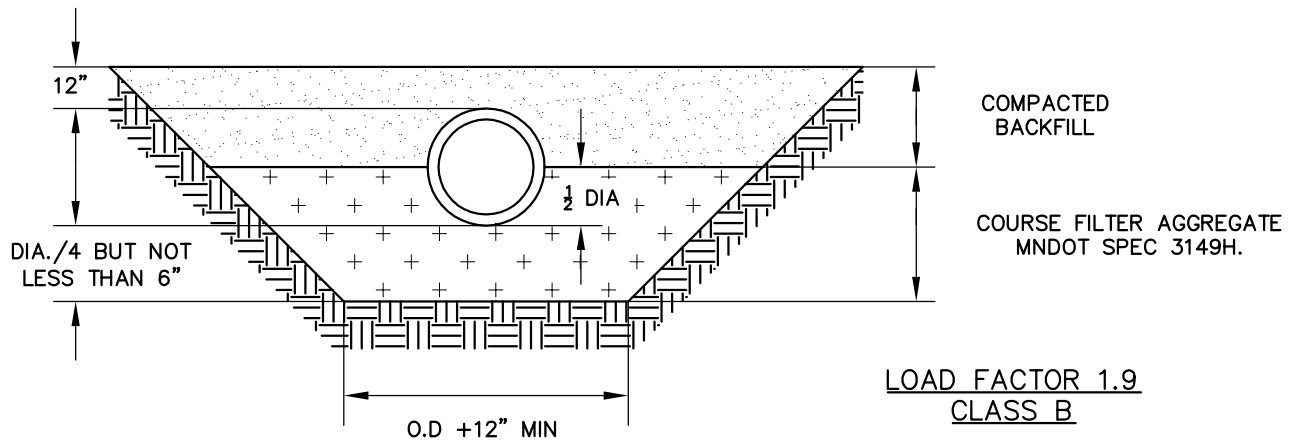


LAST REVISION
NOVEMBER 2014

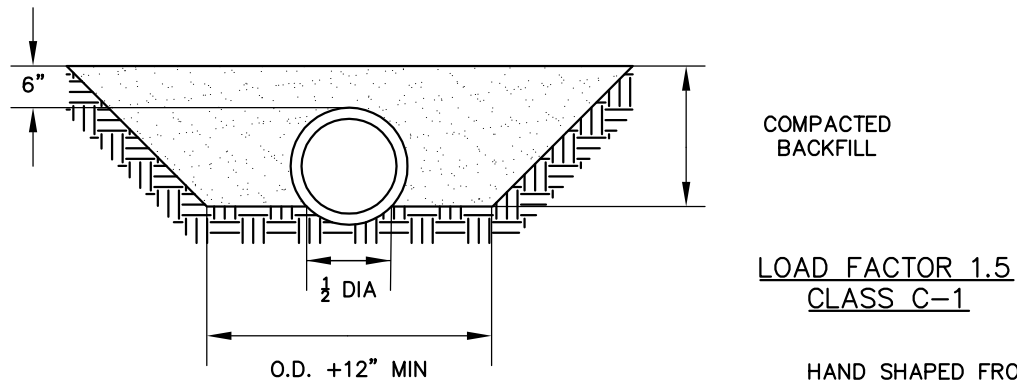
MINIMUM LIFT STATION AND VALVE MANHOLE SECTION VIEW REQUIREMENTS

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

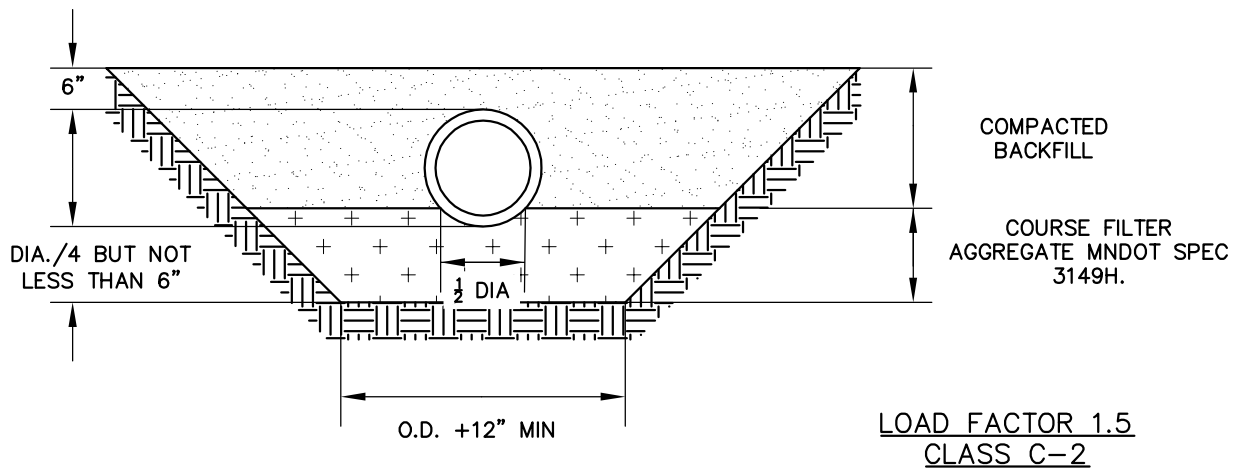
STANDARD
PLATE #
SS-13



HAND SHAPED FROM
ANGULAR BEDDING MATERIAL



HAND SHAPED FROM
FIRM UNDISTURBED SOIL



HAND SHAPED FROM
ANGULAR BEDDING MATERIAL

NOTES:

"DIA" DENOTES OUTSIDE DIAMETER OF PIPE

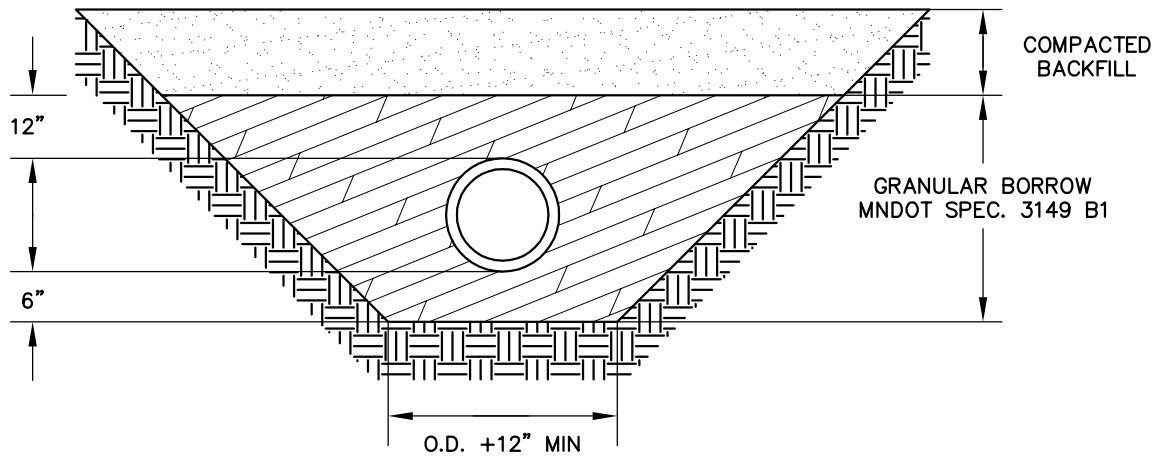


LAST REVISION
NOVEMBER 2014

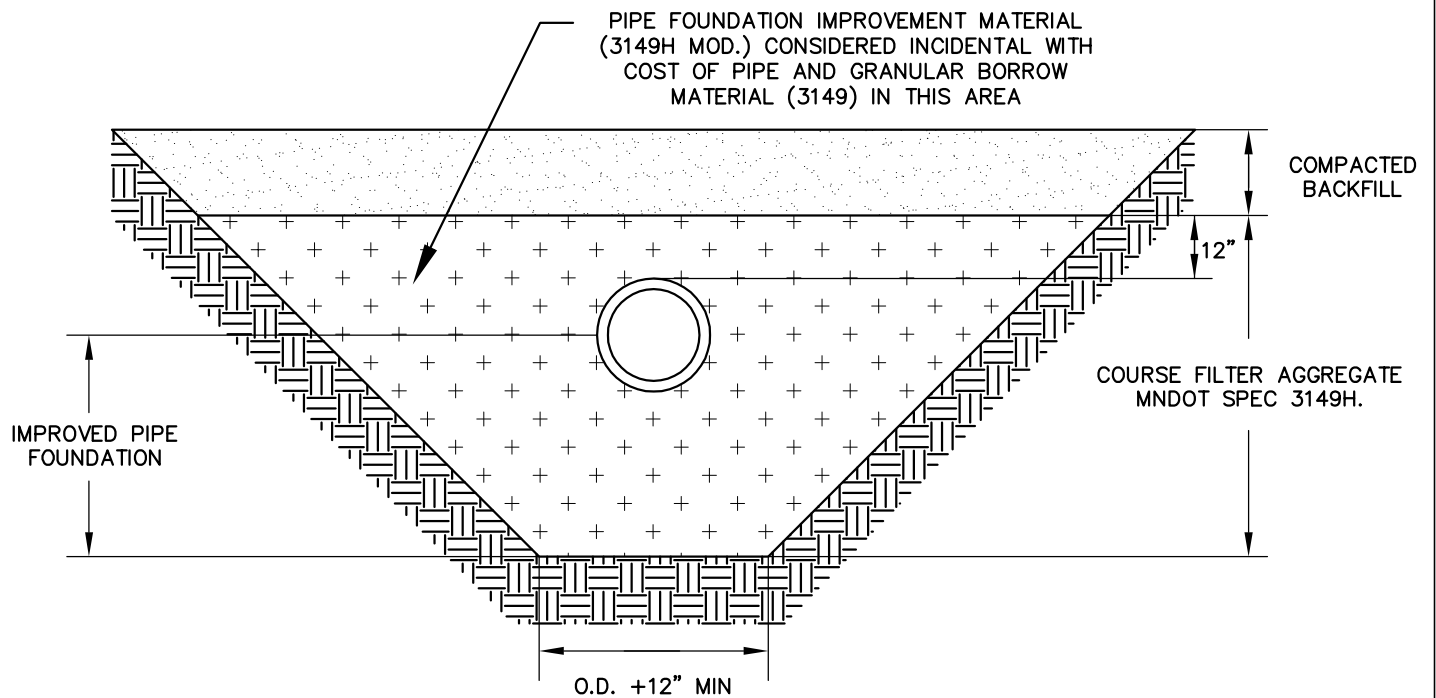
PIPE BEDDING METHODS FOR RCP OR DIP

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

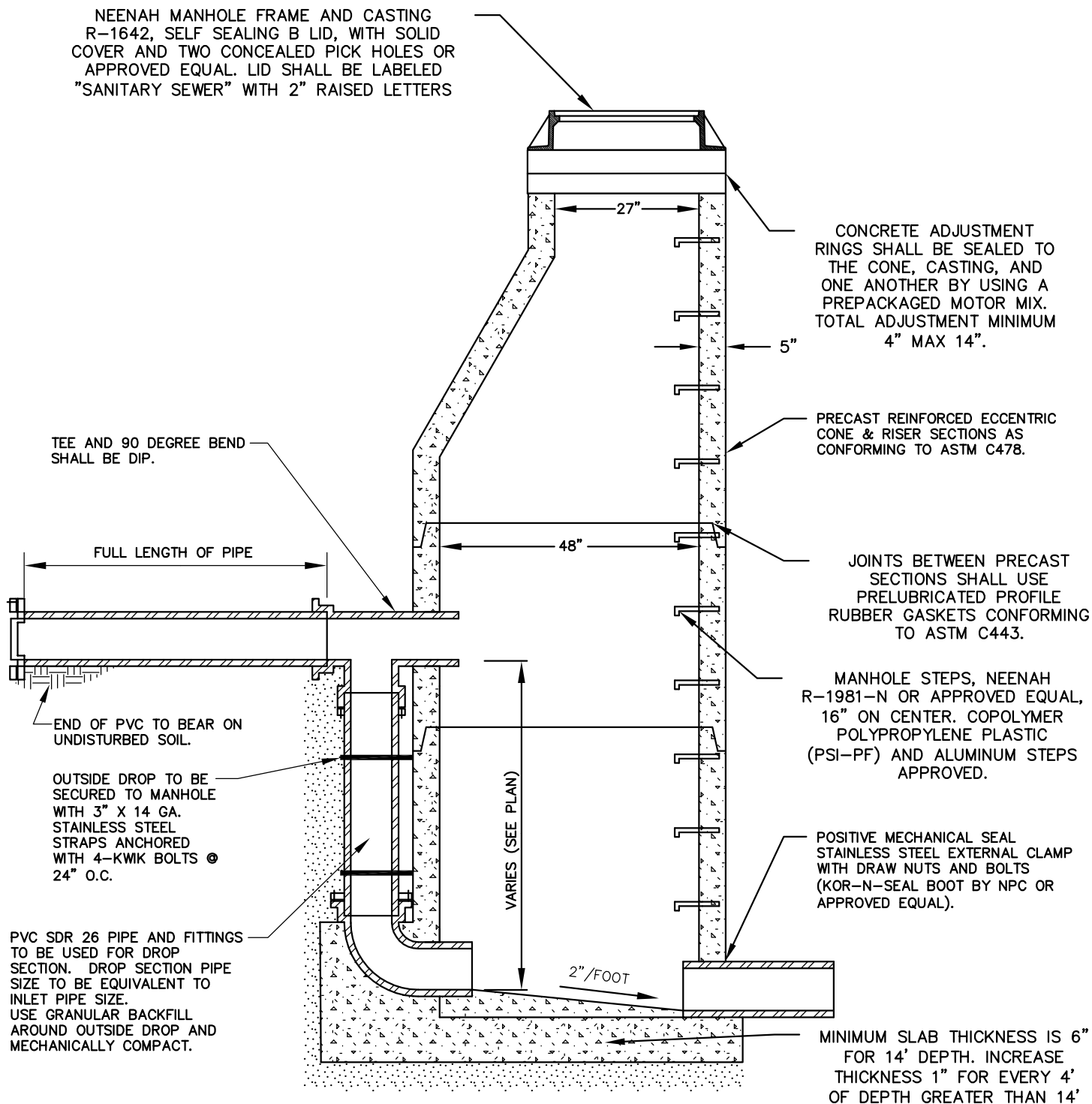
STANDARD
PLATE #
SS-14



PIPE FOUNDATION & BEDDING IN GOOD SOILS



PIPE FOUNDATION & BEDDING IN POOR SOILS



NOTES:

ALL WATER TIGHT PIPE CONNECTIONS SHALL CONFORM TO ASTM C923 FOR CONNECTIONS BETWEEN MAINTENANCE HOLE STRUCTURES AND PIPES.

POSITIVE MECHANICAL SEALS SHALL BE KOR-N-SEAL FOR PIPES 24" AND SMALLER. GREATER THAN 24" SHALL BE A-LOK X-CEL.

PRECAST INVERT SHOULD BE $\frac{1}{2}$ ϕ OF PIPE SLOPED 2" TOWARD INVERT

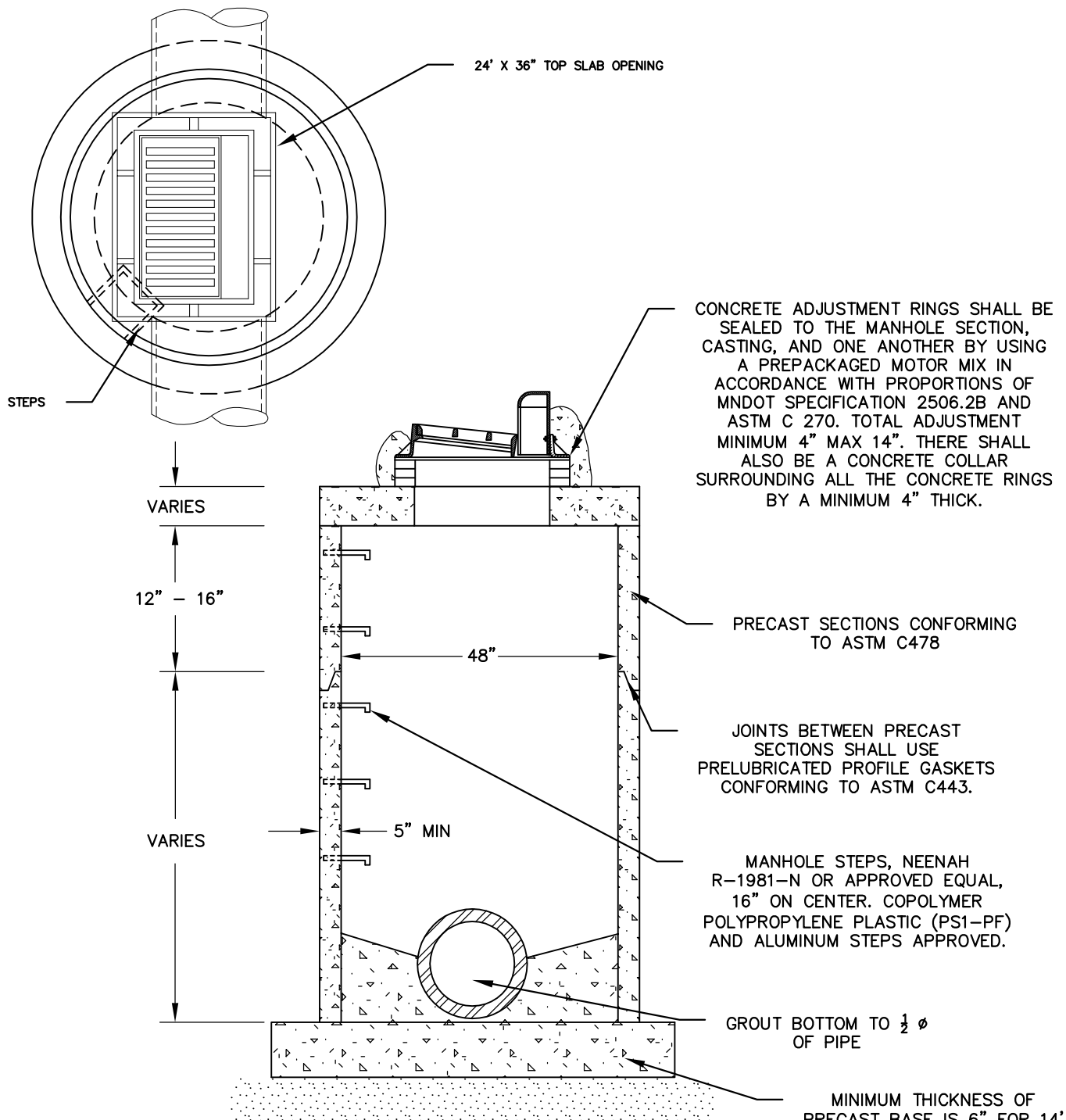


LAST REVISION
JANUARY 2016

SANITARY MANHOLE OUTSIDE DROP SECTION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SS-16



NOTES:

FRAME AND GRATE FOR BULKHEAD STYLE CURB SHALL BE A NEENAH R-3067-V OR NEENAH R-3067-VB

FRAME AND GRATE FOR SURMOUNTABLE STYLE CURB OR DRIVEWAYS SHALL BE A NEENAH R-3501-TR OR R-3501-TL LOW POINTS 3501-TB

FRAME AND GRATE FOR OFF ROAD LOCATION (DITCH GRATE, STOOL TYPE) R-4342

ALL MANHOLES WITH FRAME AND LID IN A PAVED AREA SHALL USE A NEENAH R-1642 WITH SOLID B LID WITH 2 CONCEALED PICK HOLES OR APPROVED EQUAL. LID SHALL BE LETTERED "STORM SEWER" WITH 2" RAISED LETTERS

DOG HOUSES SHALL BE GROUTED ON BOTH THE OUTSIDE AND INSIDE OF THE STRUCTURE

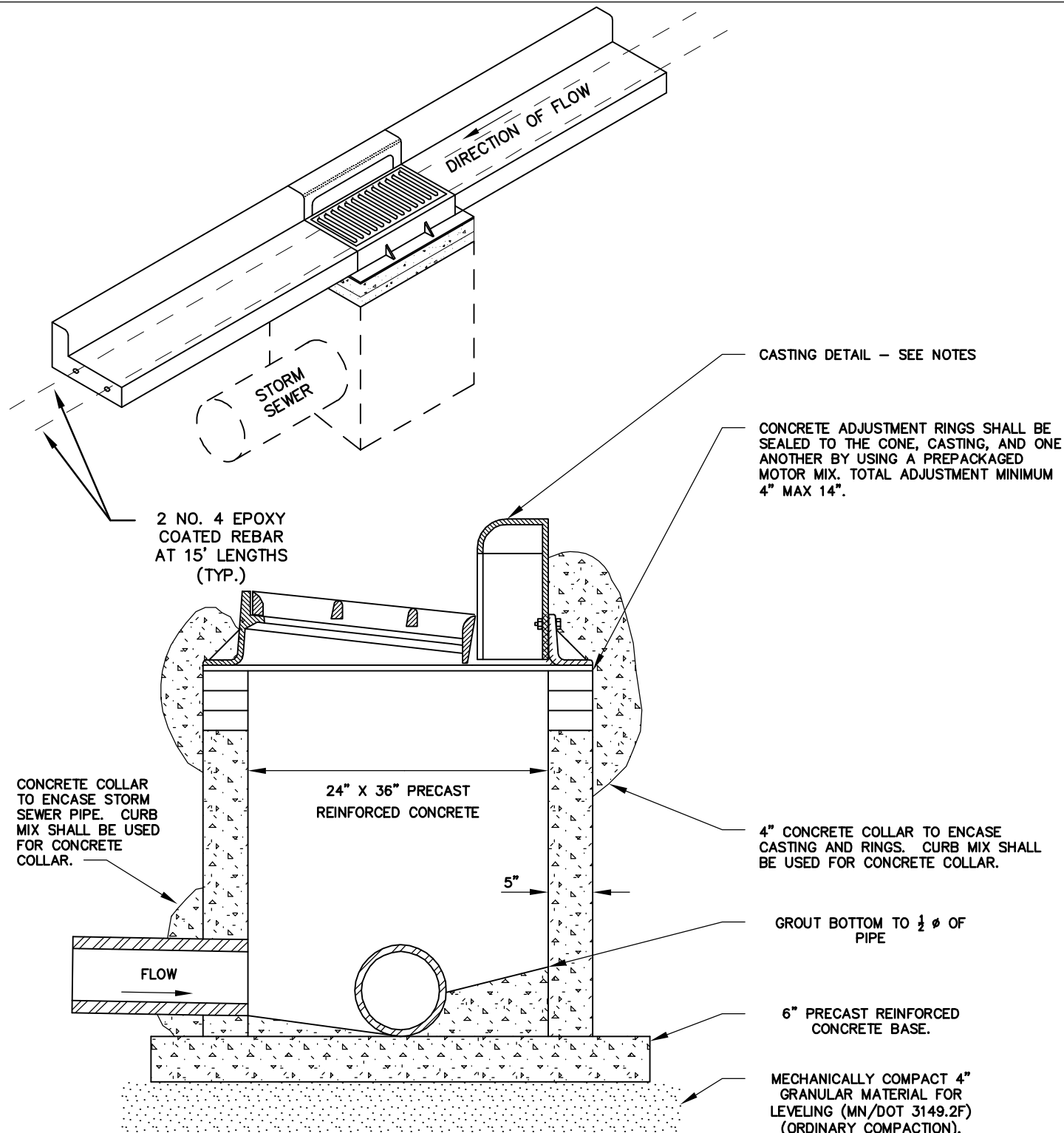


LAST REVISION
NOVEMBER 2014

CATCH BASIN MANHOLE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-1



NOTES:

FRAME AND GRATE FOR BULKHEAD STYLE CURB SHALL BE A NEENAH R-3067-V OR NEENAH R-3067-VB

FRAME AND GRATE FOR SURMOUNTABLE STYLE CURB OR DRIVEWAYS SHALL BE A NEENAH R-3501-TR OR R-3501-TL. LOW POINTS SHALL BE R-3501-TB

FRAME AND GRATE FOR OFF ROAD LOCATION (DITCH GRATE, STOOL TYPE) R-4342

DOG HOUSES SHALL BE GROUTED ON BOTH THE OUTSIDE AND INSIDE OF THE STRUCTURE

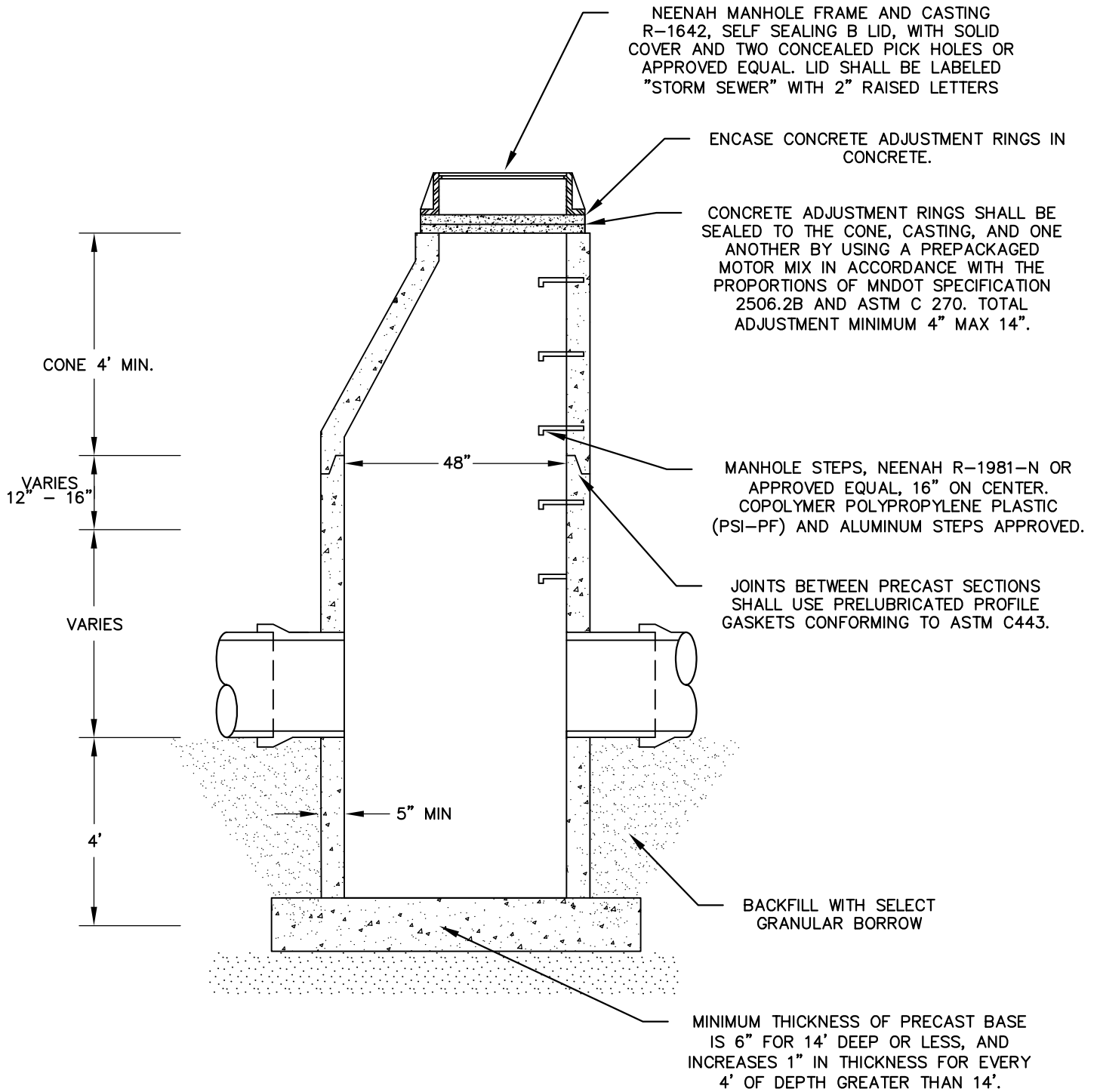


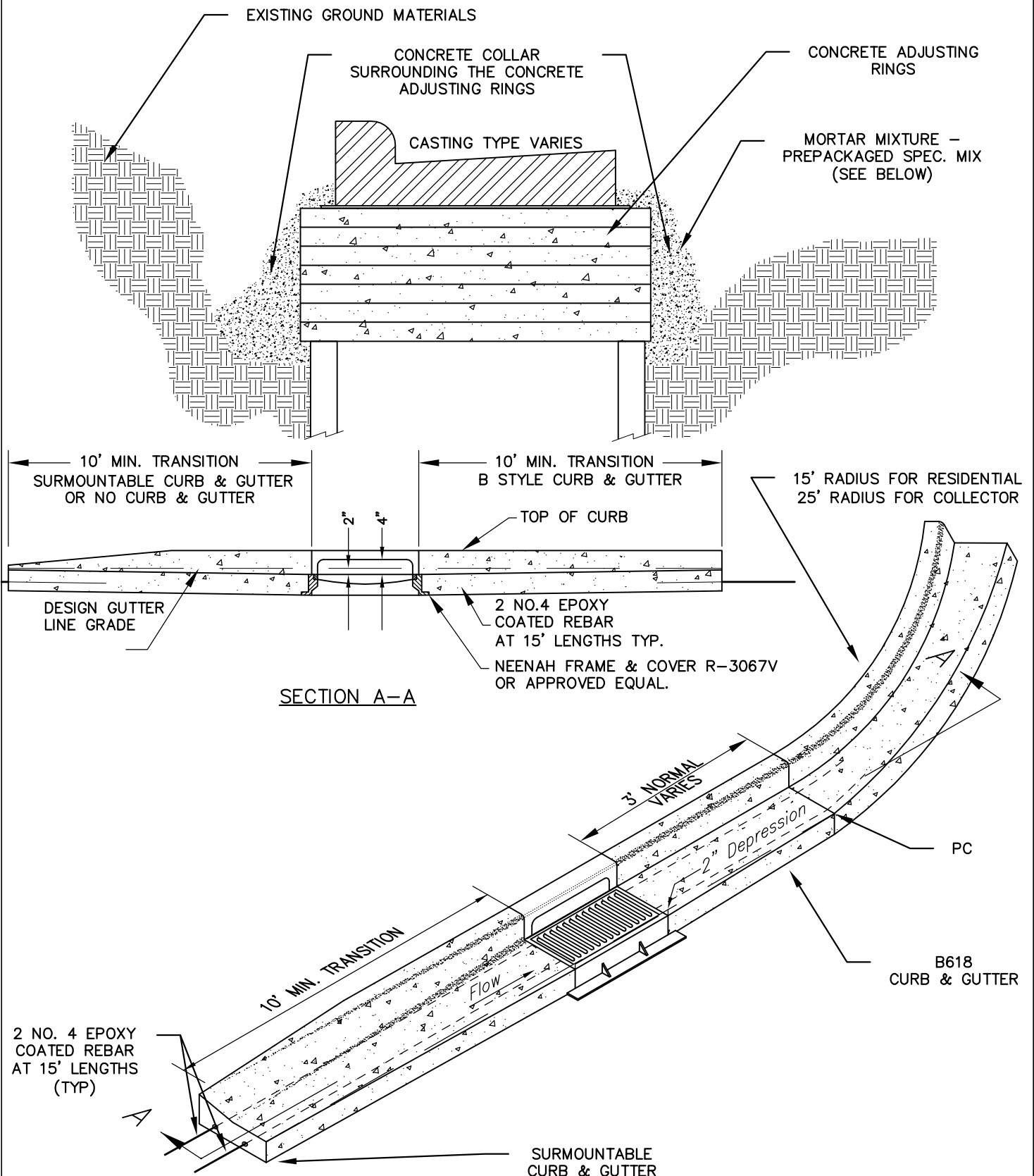
LAST REVISION

CATCH BASIN 2'X3'

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-2





NOTES:

THE CONCRETE ADJUSTMENT RINGS SHALL BE SEALED TO THE CONE, CASTING AND ONE ANOTHER BY USING A PREPACKAGED MORTAR MIX IN ACCORDANCE WITH PROPORTIONS OF MNDOT SPECIFICATION 2506.2B AND ASTM C 270. THIS WILL ALSO BE USED FOR ALL "MUD WORK" INSIDE OF CONCRETE STRUCTURES

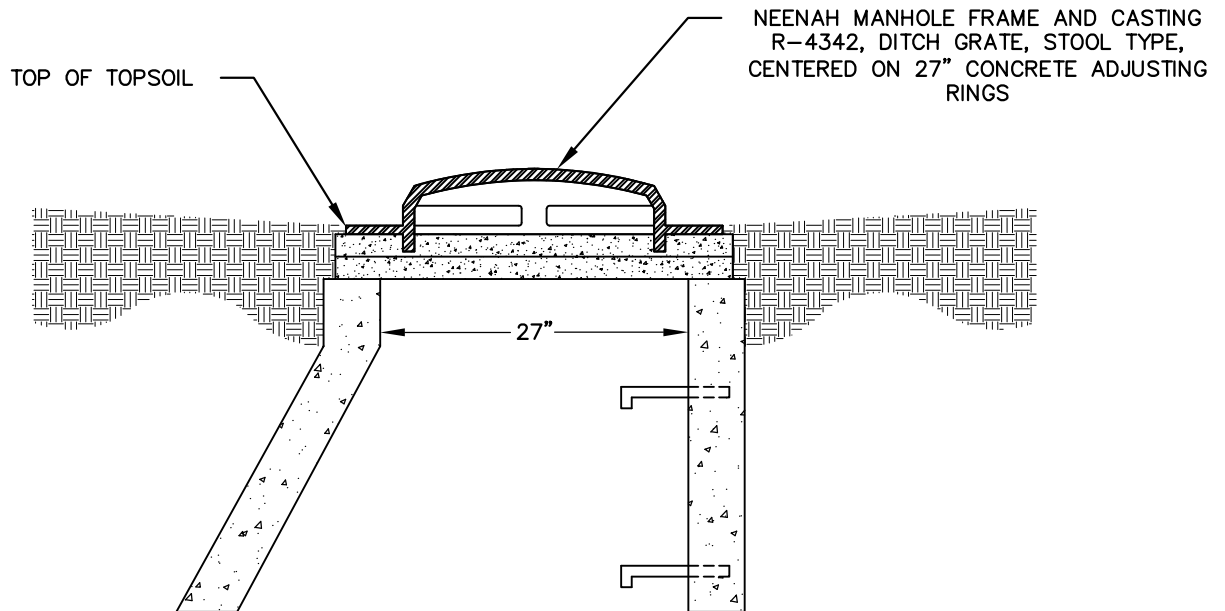
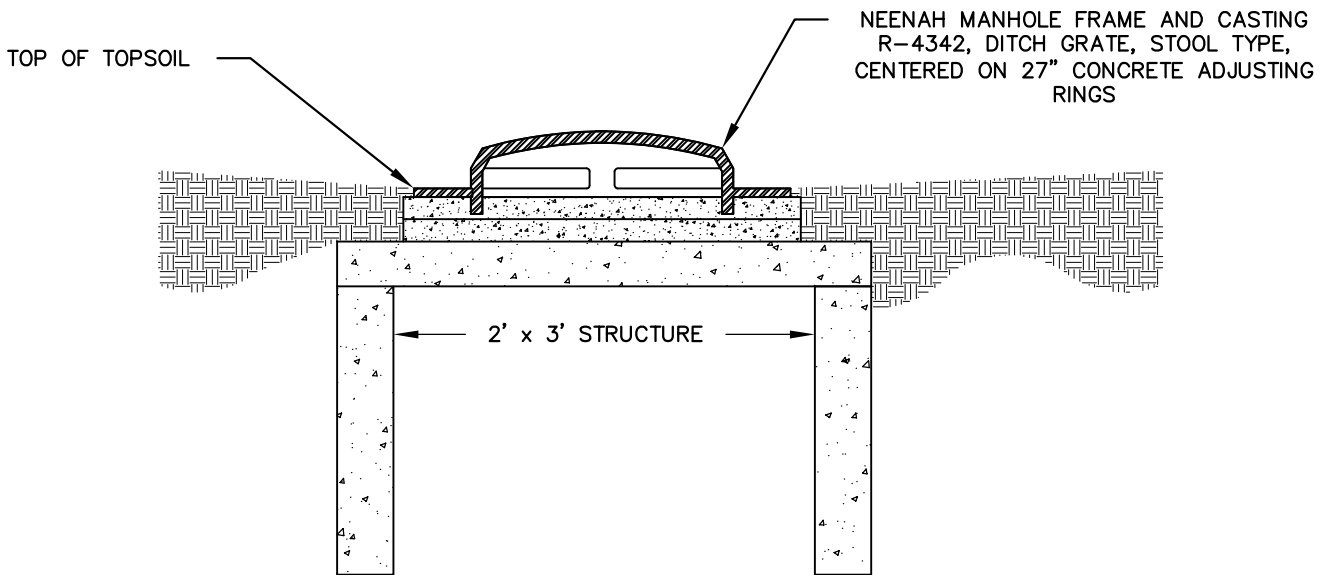


LAST REVISION
NOVEMBER 2014

CB ADJUSTMENT AND CB PLACEMENT IN CONCRETE CURB & GUTTER

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-4



NOTES:

THE CONCRETE ADJUSTING RINGS SHALL BE SEALED TO THE CONE AND ONE ANOTHER BY USING MORTAR MIX IN ACCORDANCE WITH THE PROPORTIONS OF MNDOT SPECIFICATION 2506.2B AND ASTM C 270.

THIS WILL ALSO BE USED FOR ALL "MUD WORK" INSIDE OF CONCRETE STRUCTURES

THE CASTING SHALL NOT BE SEALED TO THE ADJUSTMENT RINGS TO FACILITATE IN THE REMOVAL OF THE CASTING IF NECESSARY.

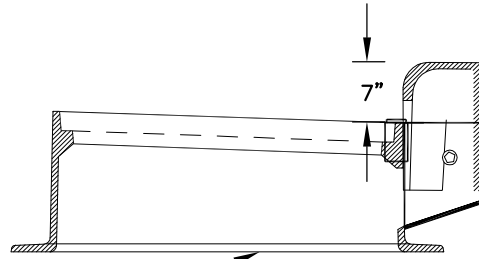


LAST REVISION
NOVEMBER 2014

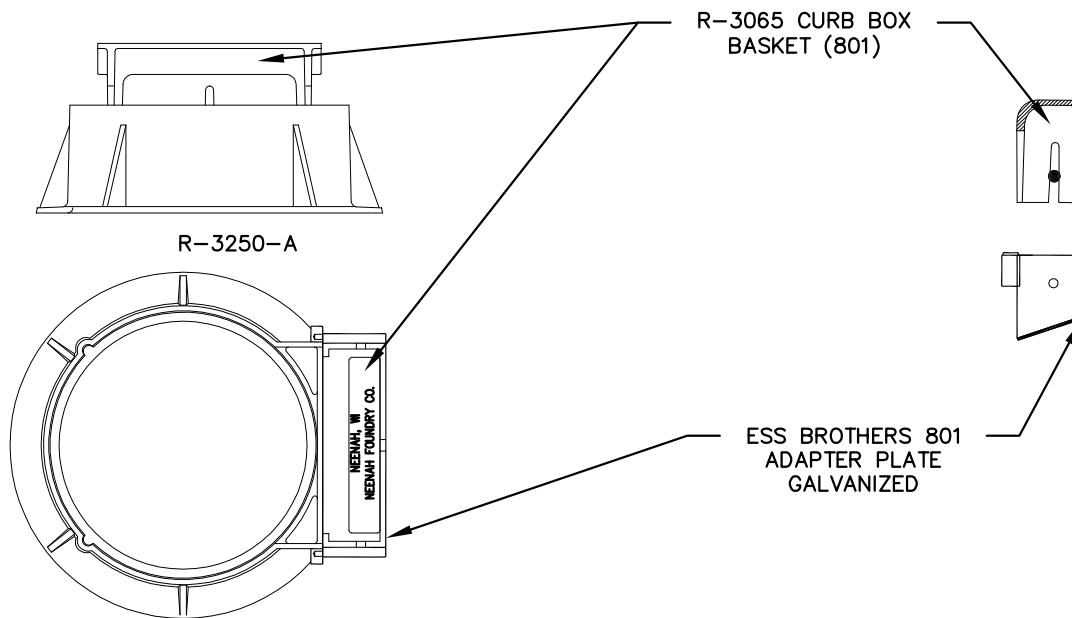
CATCH BASIN FOR R-4342 CASTING

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-5



R-3250-A



NOTES:

R-3065 CURB BOX BASKET (801)

ESS BROTHERS 801 ADAPTER PLATE GALVANIZED TO EXISTING R-3250-A



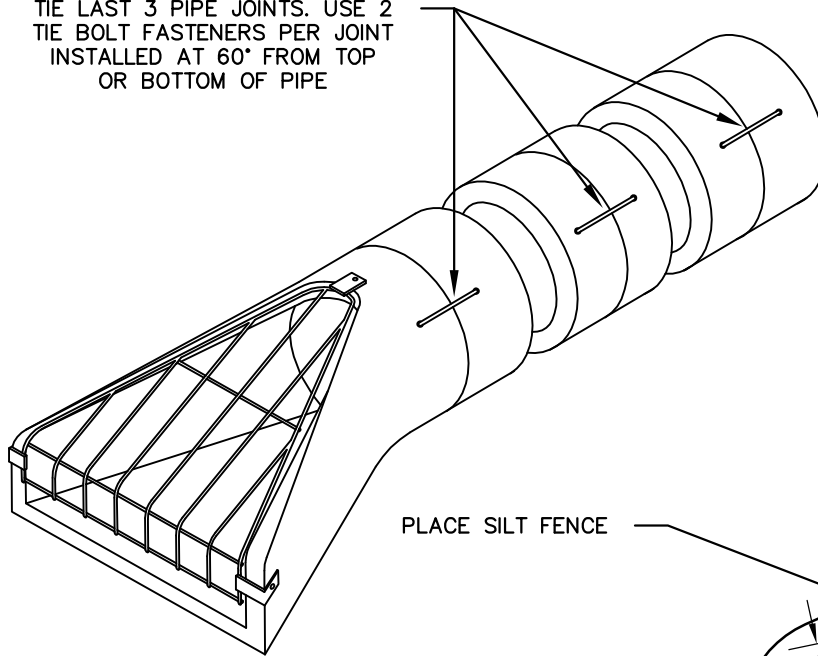
LAST REVISION
NOVEMBER 2014

CATCH BASIN CASTING R-3250-A CURB BOX ADAPTER

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-6

TIE LAST 3 PIPE JOINTS. USE 2
TIE BOLT FASTENERS PER JOINT
INSTALLED AT 60° FROM TOP
OR BOTTOM OF PIPE



PLACE SILT FENCE

NOTES:

RIP RAP AS SPECIFIED IN MNDOT STANDARD
SPECS. 2511.3 AND 3601.2.

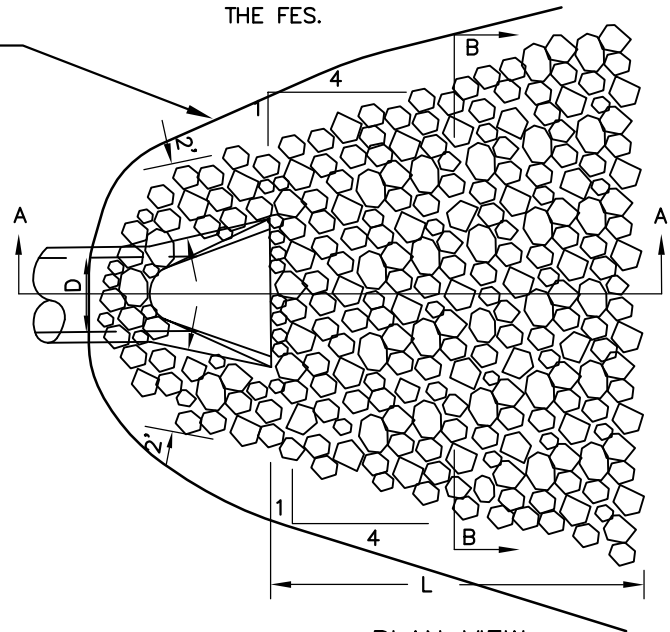
RIP RAP QUANTITY SHALL BE IN
ACCORDANCE WITH MNDOT STANDARD
PLATE 3133.

PROVIDE 3 CLIPS TO FASTEN TRASH GUARD
TO FLARED END.

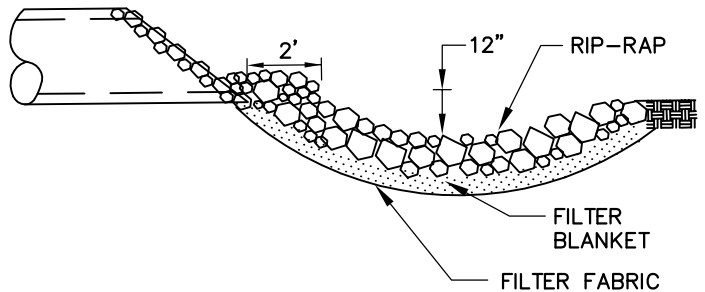
TRASH GUARD TO BE HOT DIP GALVANIZED
AFTER FABRICATION.

SIZED OUTLETS AT THE DISCRETION OF THE
ENGINEER.

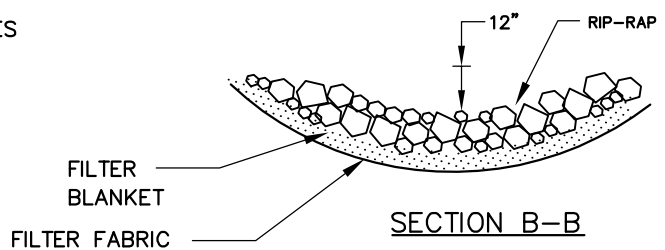
IF THE PLANS CALL FOR A HDPE FLARED
END SECTION THE CONTRACTOR SHALL
SUPPLY A STAINLESS STEEL THREADED
ROD, WASHERS AND WING NUTS INSTEAD
OF THE PLASTIC ONES THAT COME WITH
THE FES.



PLAN VIEW

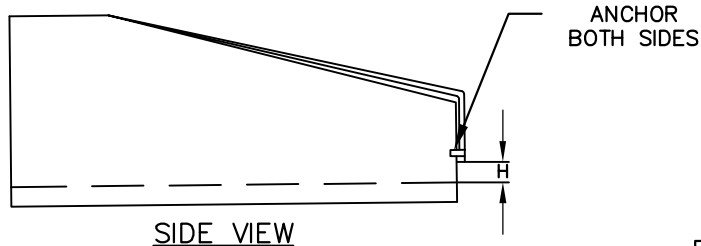


SECTION A-A



SECTION B-B

PIPE SIZE	BAR SIZE	"H"	BOLT SIZE
12" - 18"	3/4"Ø	6"	5/8"
21" to 42"	1"Ø	6"	3/4"
48" to 72"	1 1/4"Ø	12"	1"



SIDE VIEW

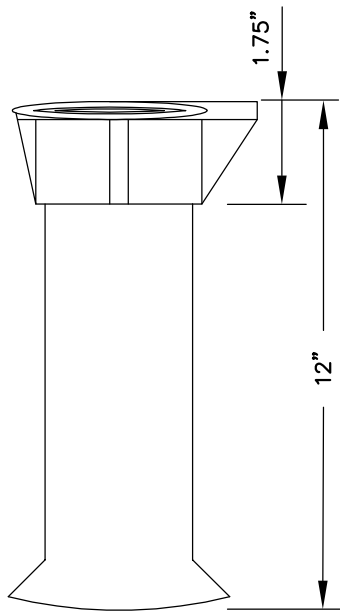


LAST REVISION
NOVEMBER 2014

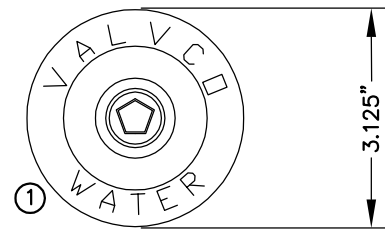
FLARED END SECTION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

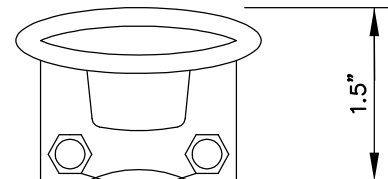
STANDARD
PLATE #
STS-7



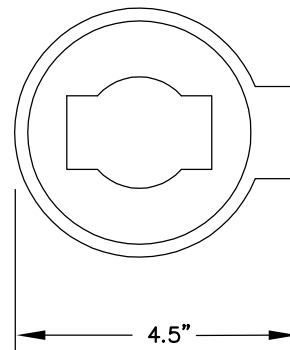
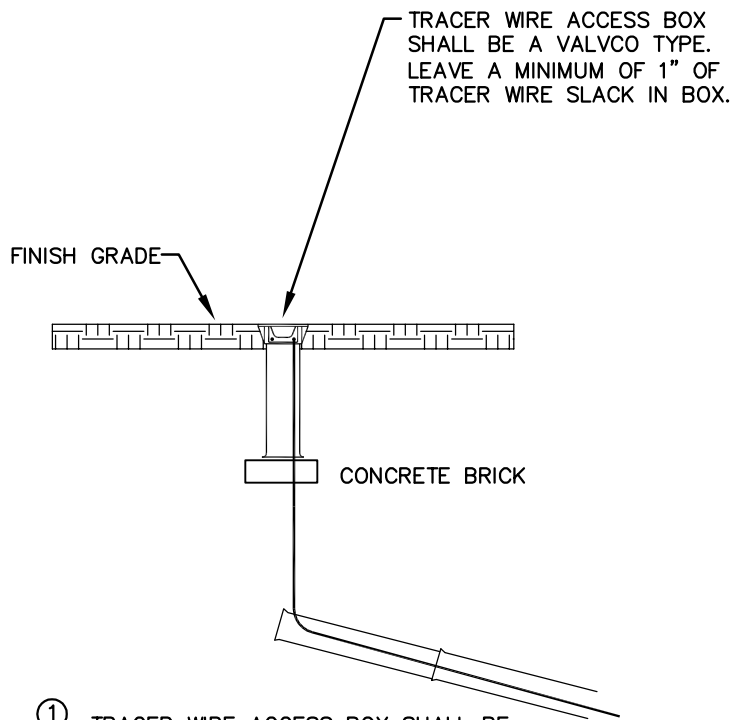
COMPLETE BOX SIDE VIEW



LID TOP VIEW



STAINLESS STEEL
TERMINAL BOLTS
LID SIDE VIEW



COLLAR VIEW TOP

① TRACER WIRE ACCESS BOX SHALL BE MANUFACTURED WITH THE FOLLOWING TEXT AND COLOR

- WATER = BLUE
- STORM SEWER = GREEN
- SANITARY SEWER = GREEN
- ALL OTHER OTHER UTILITIES SHALL HAVE NO TEXT AND BE PAINTED BY THE CONTRACTOR IN THE FIELD WITH ENAMEL PAINT CONSISTENT WITH THE AMERICAN PUBLIC WORKS ASSOCIATION COLOR CODE.

NOTES:

CASTING CONFORMS TO: ASTM
SPECIFICATION A-48 CLASS 30

ABS SHAFT CONFORMS TO: ASTM
SPECIFICATIONS D-1788

TRACER WIRE ACCESS BOXES SHALL BE
MANUFACTURED BY CP TEST SERVICES –
VALVCO, INC.

NOTES:

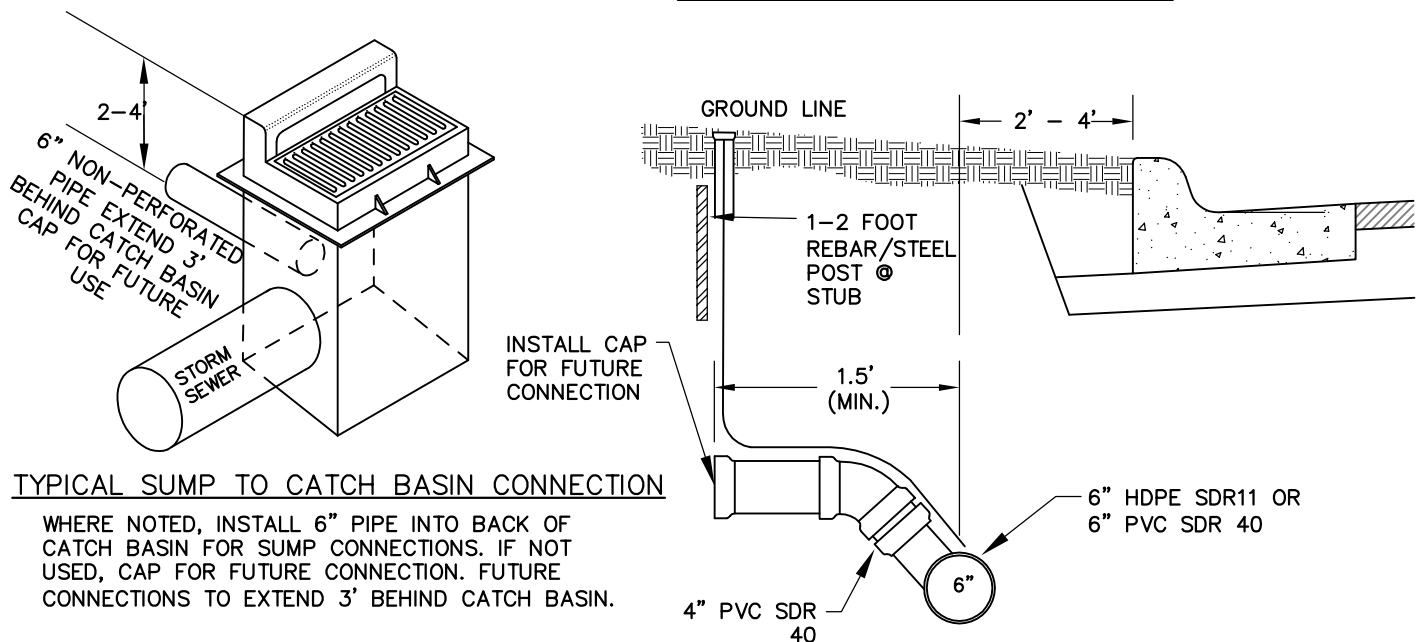
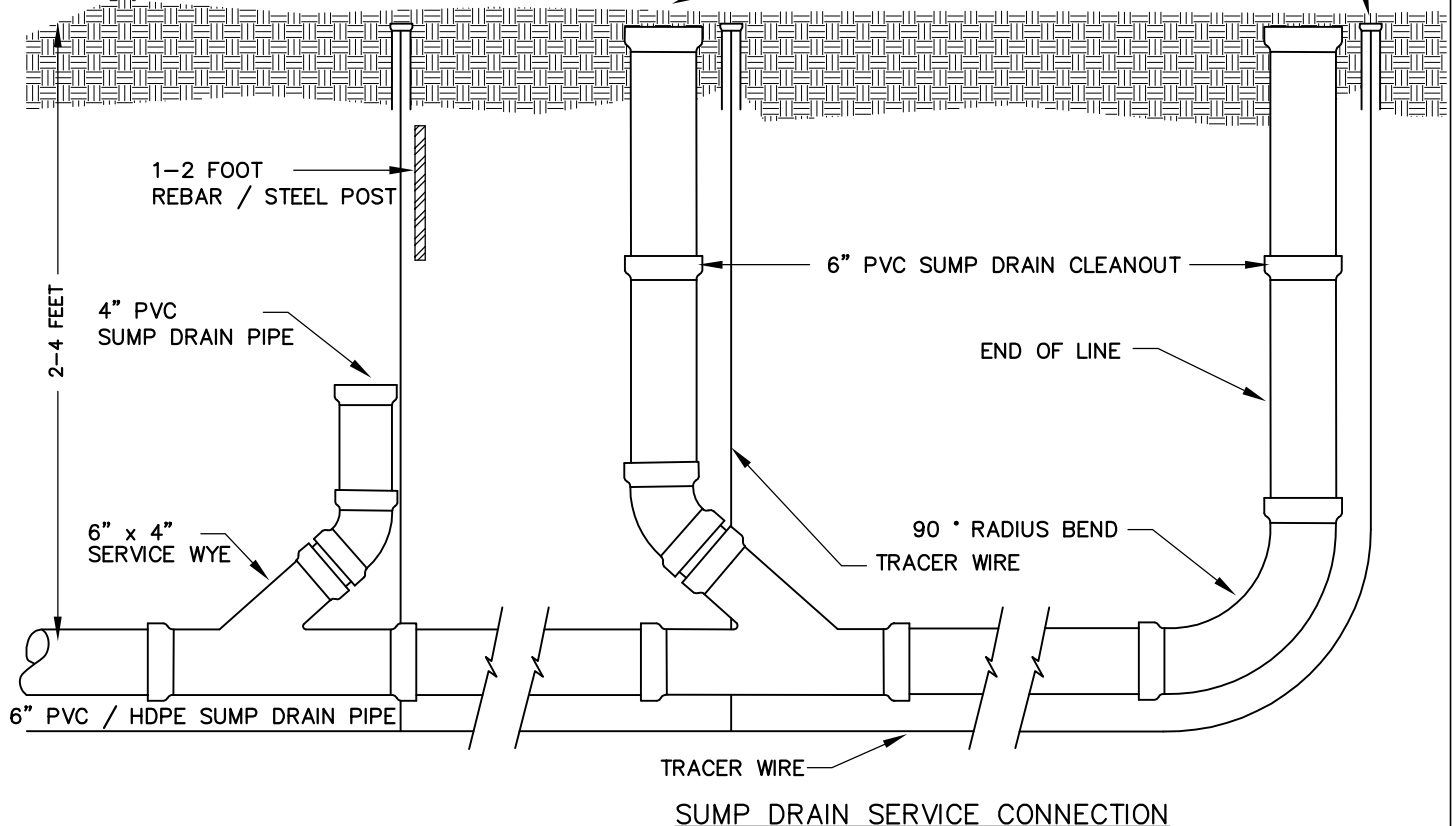
INSTALL CLEANOUTS AT 300 FOOT INTERVALS AND AT DEAD ENDS.
CLEAN OUT SERVICE TIES SHALL BE RECORDED WITH CITY
PROPERTY RECORDS AND UTILITY AS BUILT RECORDS.

WHEN PVC SDR 40 IS USED FOR SUMP DRAIN, A PVC SDR 40
WYE/TEE SHALL BE USED.

A FLEXIBLE SADDLE TEE/WYE SHALL BE A FERNCO BRAND OR
APPROVED EQUAL WHEN HDPE PIPE IS USED FOR SUMP DRAIN.
WHEN A FERNCO IS INSTALLED THE CONTRACTOR SHALL INSTALL
A CONCRETE COLLAR AROUND THE ENTIRE FERNCO AT NO
ADDITIONAL COST TO THE CITY.

TRACER WIRE SHALL RUN THE
FULL LENGTH OF CLEANOUT
AND BE INSTALLED IN A
TRACER WIRE ACCESS BOX
CONFORMING TO MAPLE GROVE
STANDARD PLATE STS-8. (TYP.)

ALL PVC CLEANOUTS SHALL BE
3 INCHES BELOW FINISHED
GRADE AND HAVE A FITTING
CLEANOUT - WITH THREADED
PLUG (SCHEDULE 40). (TYP.)

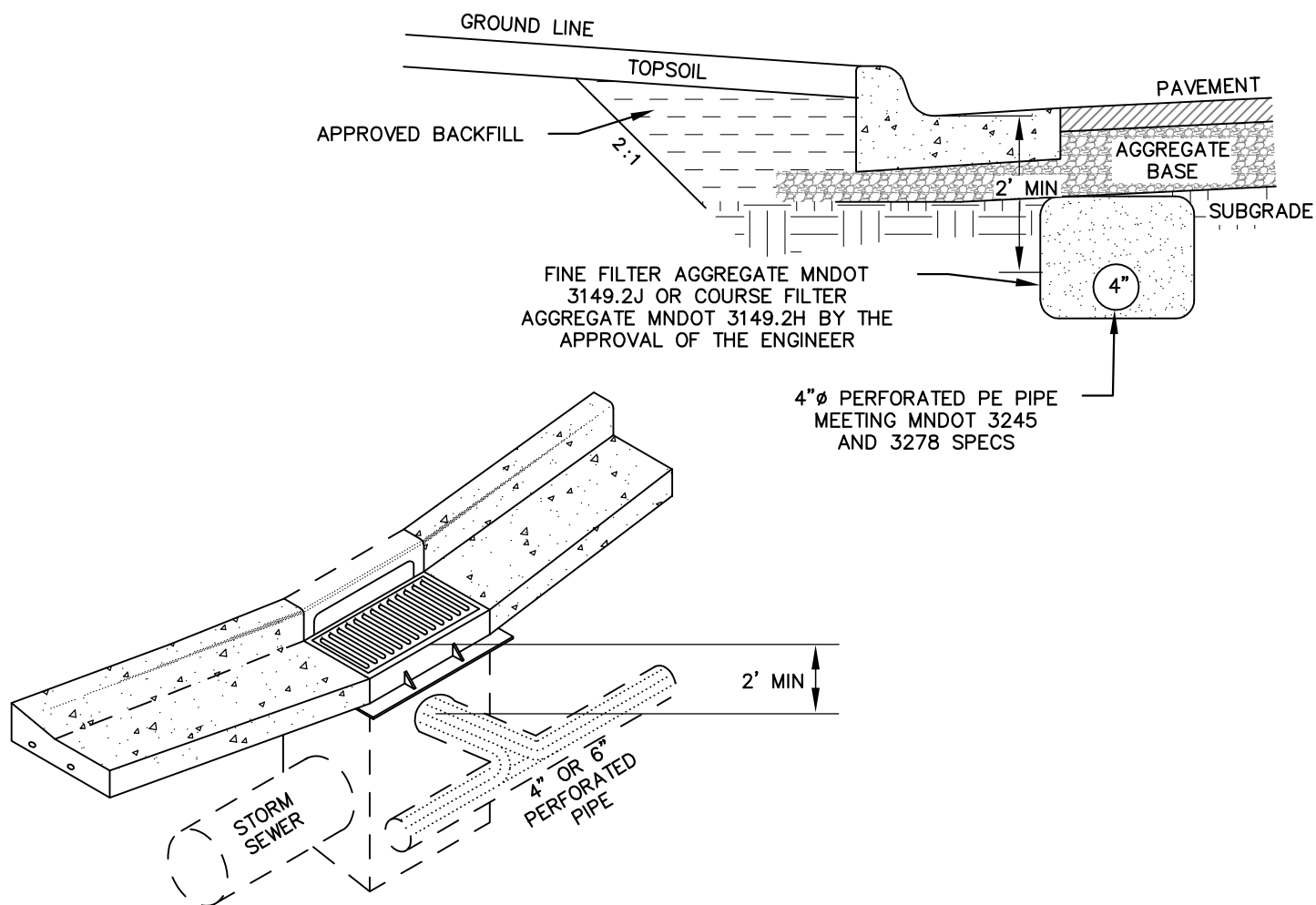


LAST REVISION
NOVEMBER 2014

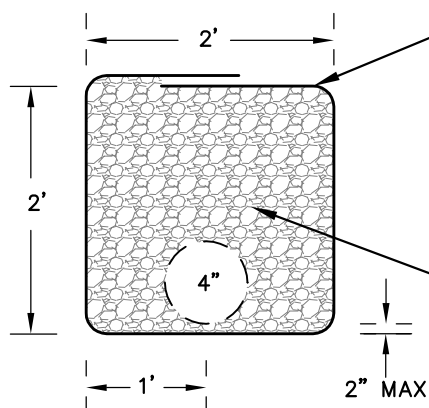
SUMP DRAIN SERVICE & CLEANOUT

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-9



COURSE FILTER AGGREGATE DETAIL



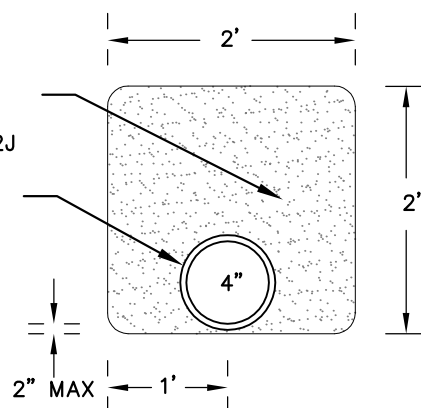
TYPE 1 FILTER
FABRIC MNDOT 3733

FINE FILTER
AGGREGATE
MNDOT 3149.2J

PROTECTIVE WRAP
MNDOT 3245 & 3278

COURSE FILTER
AGGREGATE
MNDOT 3149.2H

FINE FILTER AGGREGATE DETAIL



NOTES:

2" MAX. DEPTH OF FINE (OR COURSE) FILTER AGGREGATE AT ALL POINTS BELOW PIPE.

THE PIPE FOR BOTH INSTALLATIONS MUST BE A 4" OR 6" PERFORATED PIPE (PVC OR CORRUGATED PE) MEETING MN/DOT 3245 AND 3278 SPECS.

WHEN USING THE FINE FILTER AGGREGATE BASE THE 4" PIPE MUST HAVE A PROTECTIVE WRAP, MEETING MN/DOT 3245 AND 3278 SPECS.

WHEN USING THE COURSE FILTER AGGREGATE BASE THE TRENCH MUST BE LINED WITH TYPE I FILTER FABRIC MEETING MN/DOT SPEC. 3733



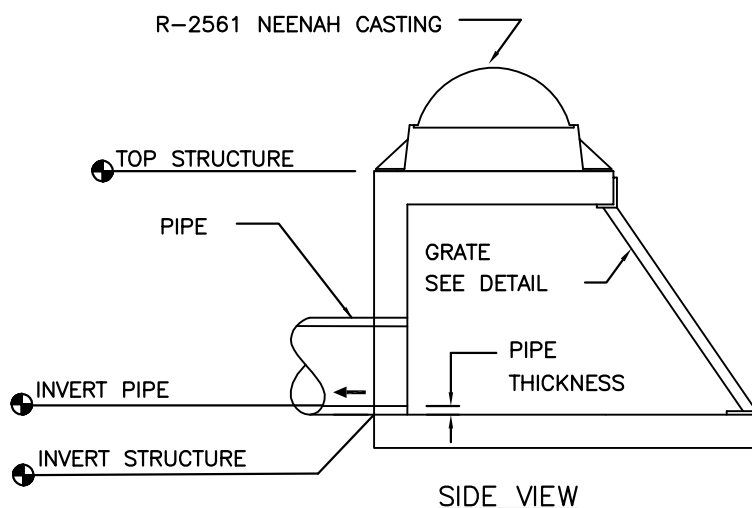
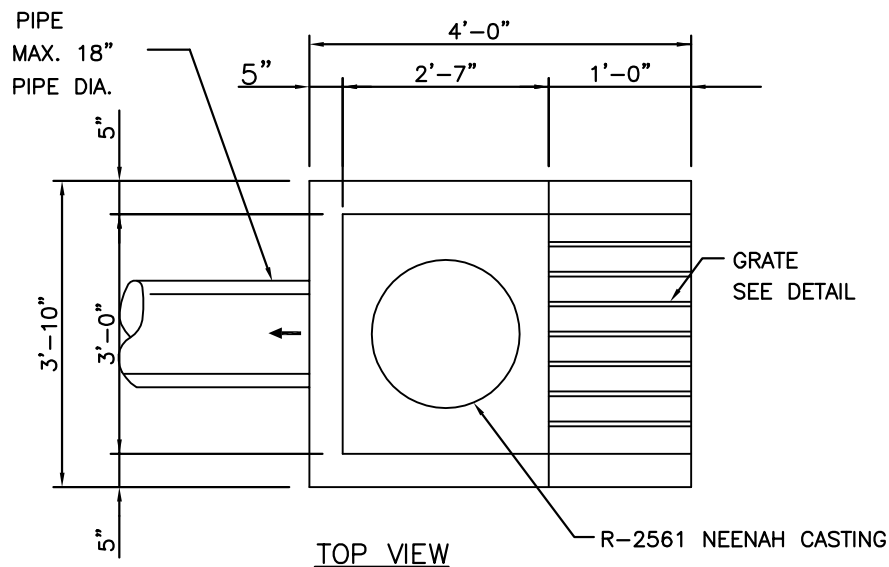
City of
Maple Grove

LAST REVISION
NOVEMBER 2014

PVC SUBDRAIN INTO LOW POINT CATCH BASIN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STS-10



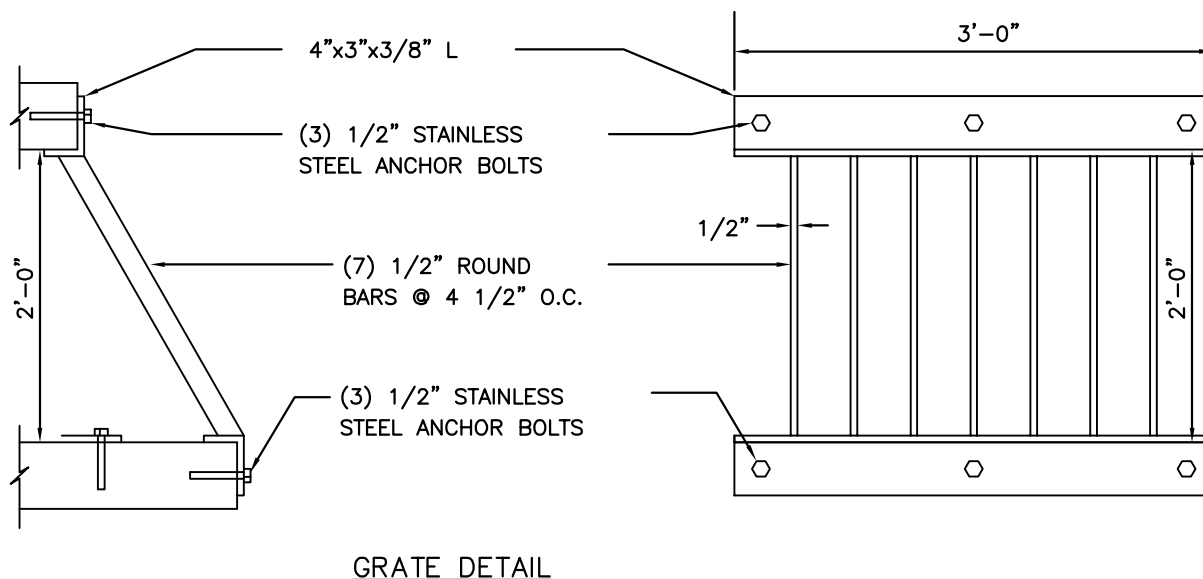
NOTES:

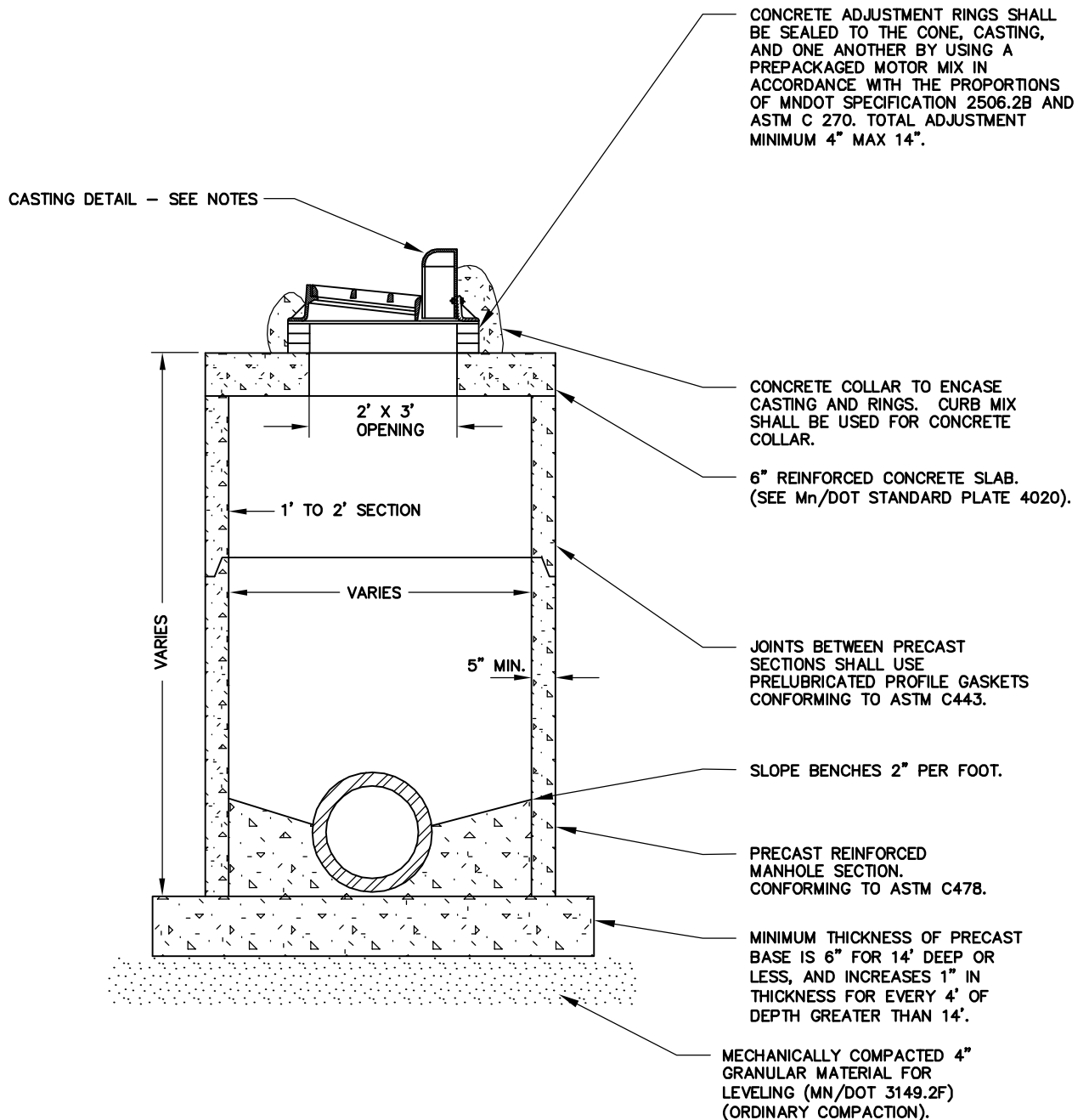
STRUCTURE SHALL BE REINFORCED PRECAST CONCRETE

GRATING SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION

ALL ANCHOR BOLTS SHALL BE $\frac{1}{2}$ " ϕ STAINLESS STEEL EXP. ANCHORS W/4" MINIMUM EMBEDMENT

MAXIMUM SIZE PIPE TO BE 18"

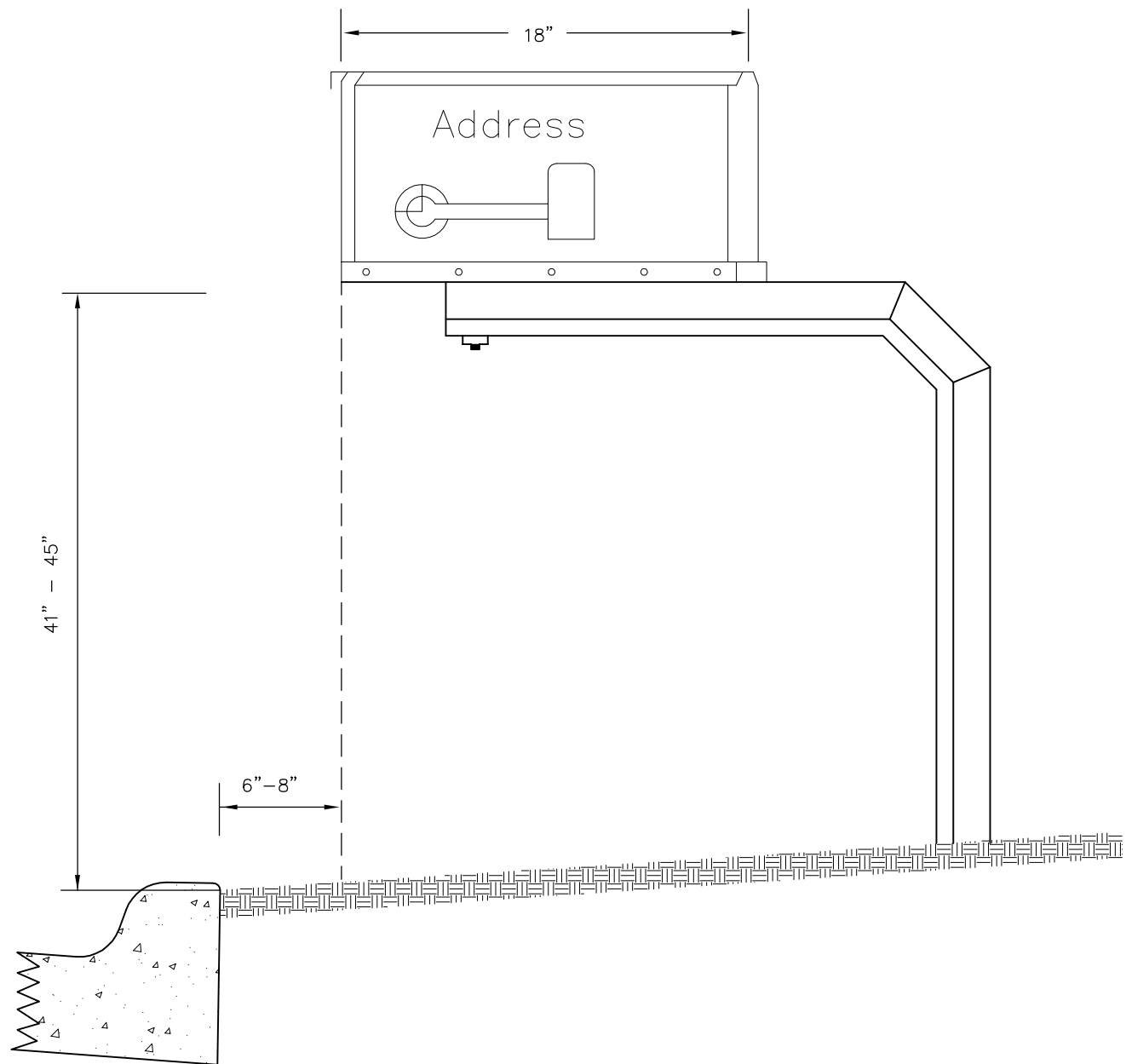




NOTES:

- FRAME AND GRATE FOR BULKHEAD STYLE CURB SHALL BE A NEENAH R-3067-V OR NEENAH R-3067-VB
- FRAME AND GRATE FOR SURMOUNTABLE STYLE CURB SHALL BE A NEENAH R-3501-TR OR TL
- ANY FRAME AND LID IN A PAVED AREA SHALL USE A NEENAH CASTING R-1642, SELF SEALING B LID, WITH SOLID COVER AND TWO CONCEALED PICK HOLES OR APPROVED EQUAL. LID SHALL BE LABELED "STORM SEWER" WITH 2" RAISED LETTERS

STANDARD STORM MANHOLE



NOTES:

POSITION YOUR MAILBOX 41" TO 45" ABOVE GROUND LEVEL

PLACE YOUR MAILBOX 6" TO 8" BACK FROM CURB. IF YOU DO NOT HAVE A RAISED CURB, USE THE EDGE OF THE BITUMINOUS.

HAVE BOX EXTENDED AS FAR IN FRONT OF SUPPORT POST AS POSSIBLE (THIS PREVENTS POSSIBLE SNOW PLOW DAMAGE)

ADDRESS MUST BE ON THE SIDE OF MAILBOX FROM WHICH CARRIER APPROACHES IN LETTERS ABOUT 1" HIGH (OR ON FRONT WHERE BOXES ARE GROUPED)

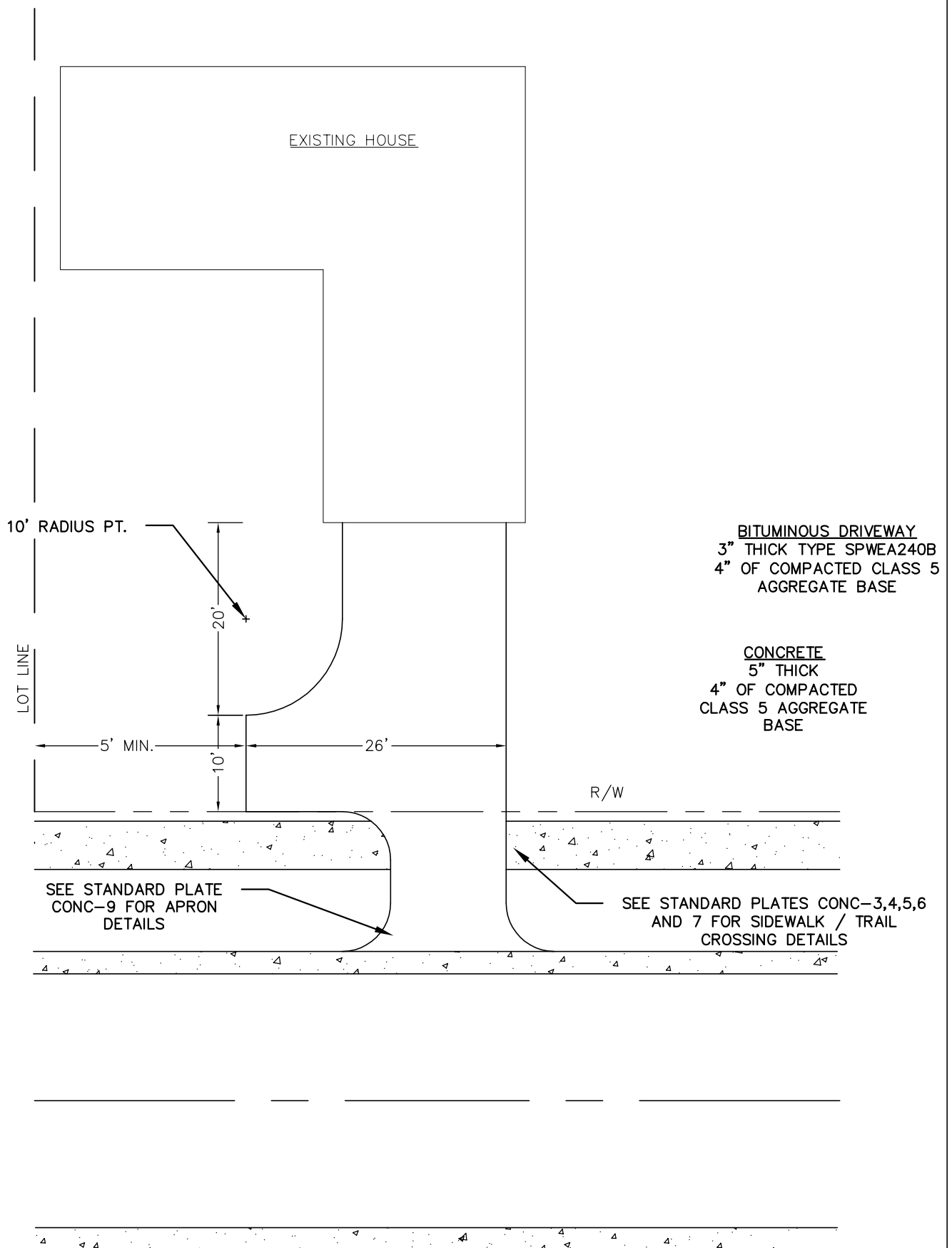


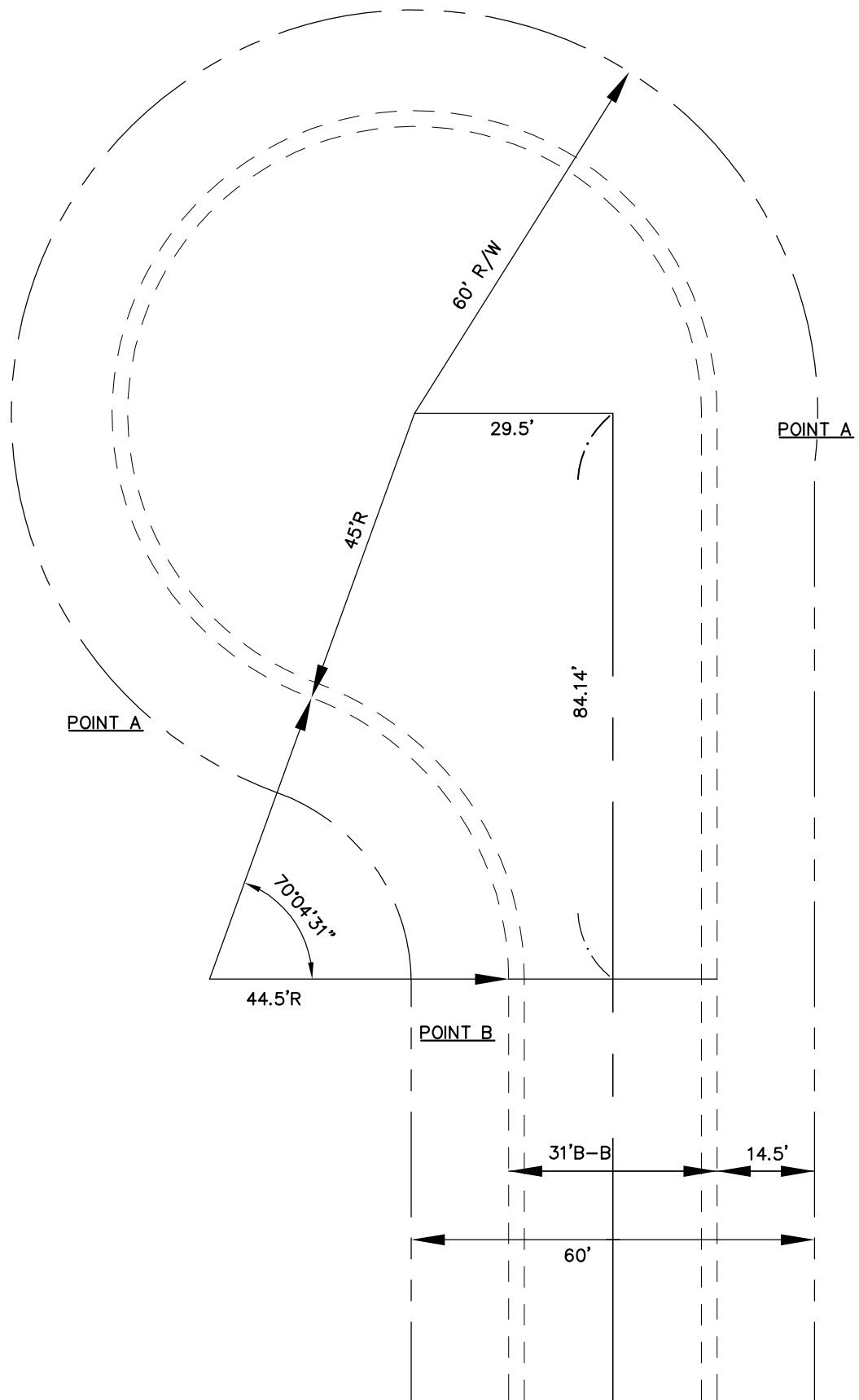
LAST REVISION
NOVEMBER 2014

MAILBOX INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STR-1





CURVE LENGTH
A-A = 196.41'
A-B = 54.4'

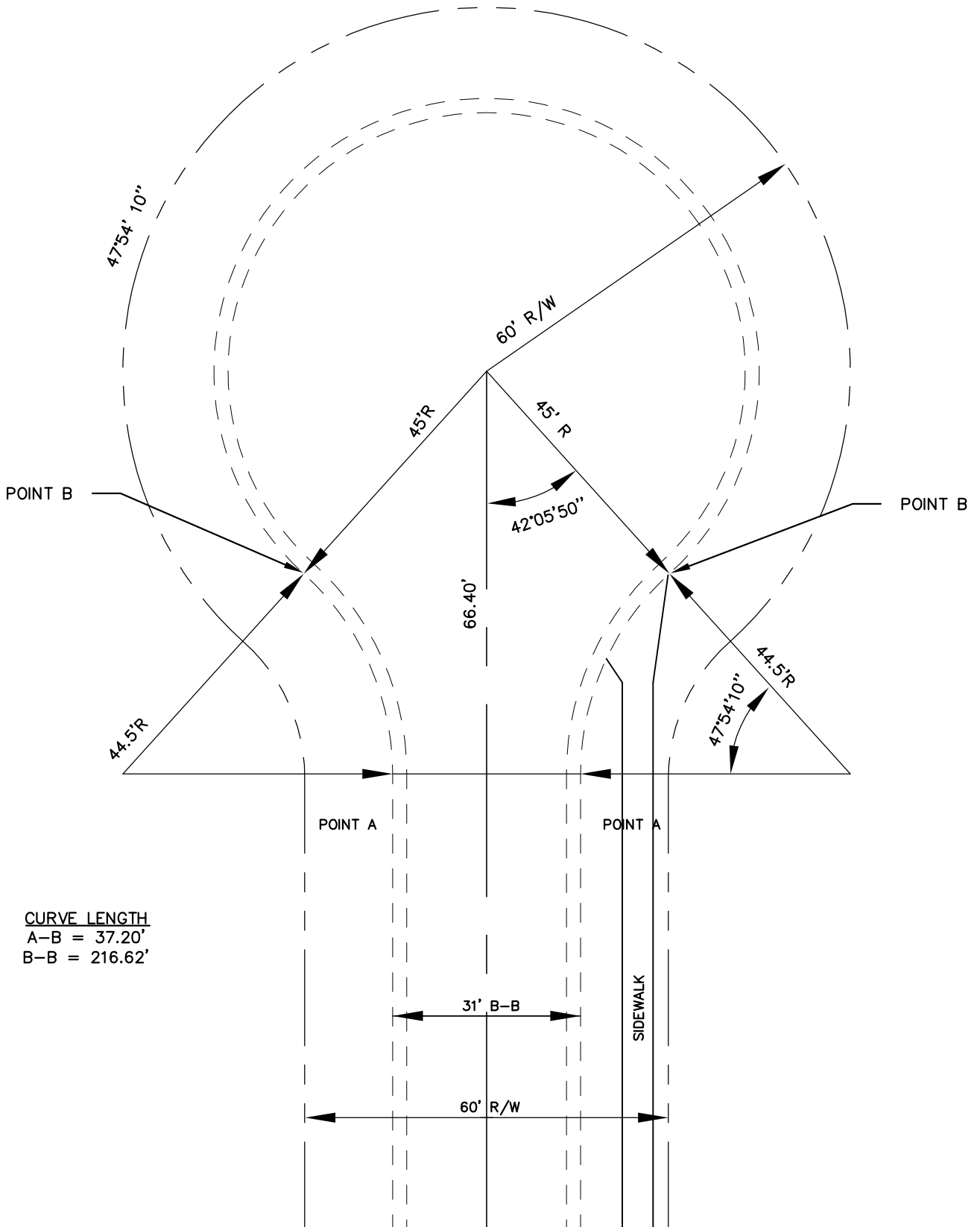


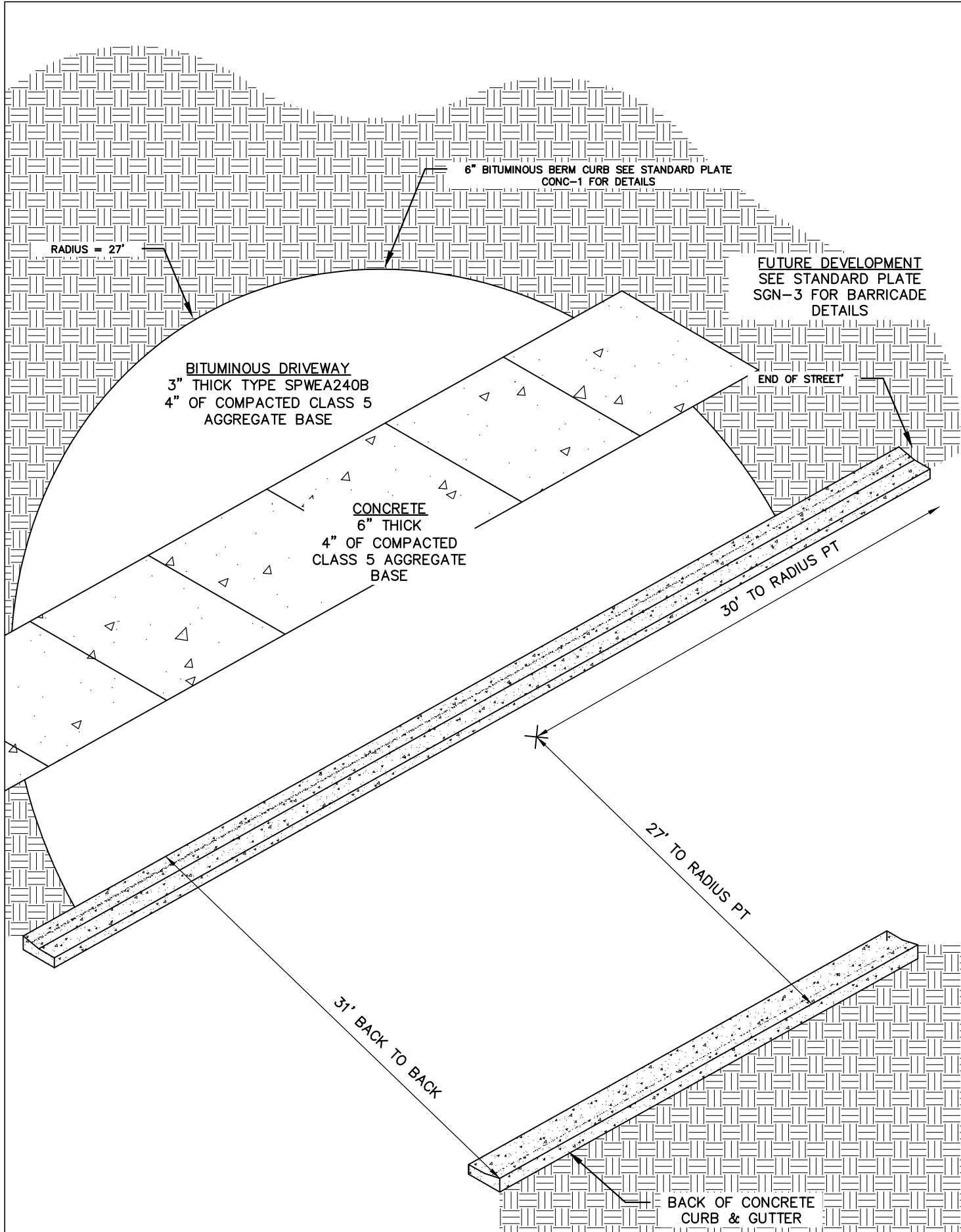
LAST REVISION
NOVEMBER 2014

OFFSET CUL-DE-SAC 60' R/W

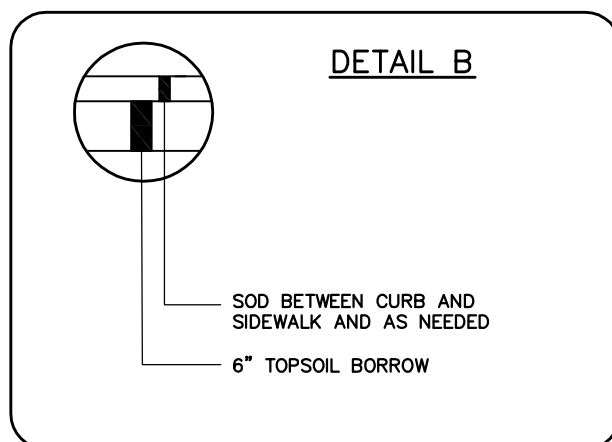
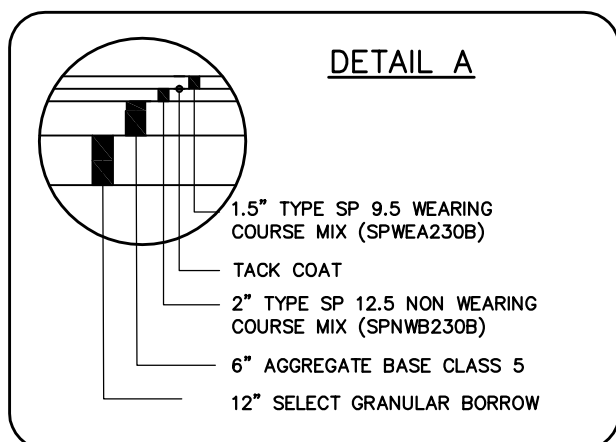
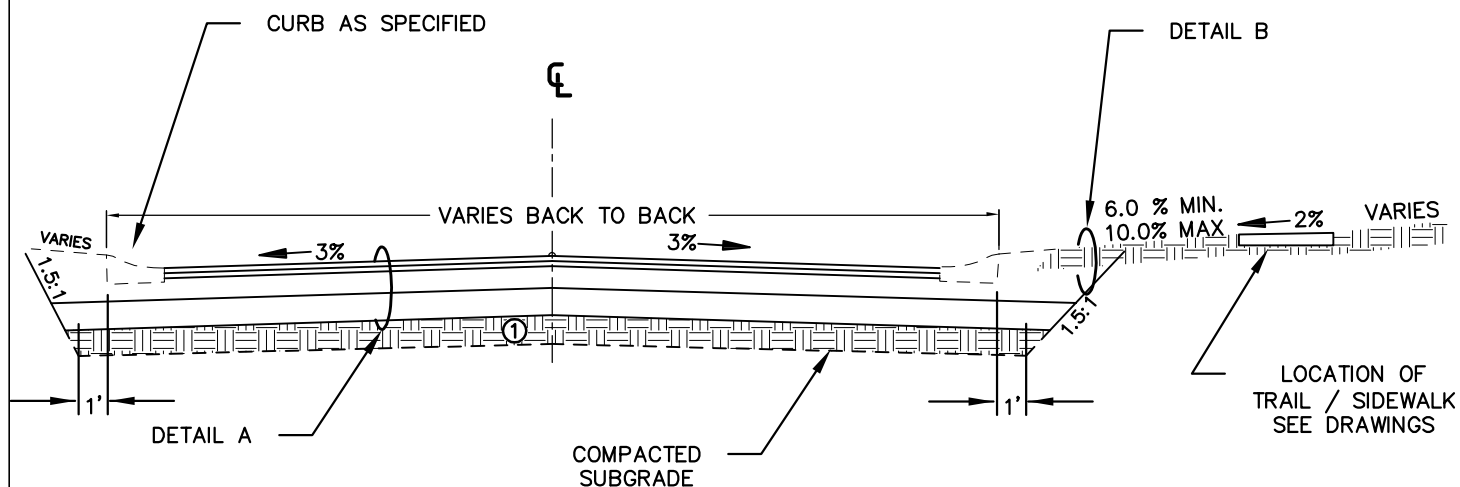
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STR-3





TEMPORARY TURN AROUND



NOTES:

CONCRETE SIDEWALK – 5" CONCRETE WITH 4" CLASS 5

BITUMINOUS TRAIL – 2 ½" BITUMINOUS WEAR (TYPE SP 9.5 WEARING COURSE MIX SPWEA240B) WITH 6" CLASS 5

SIDEWALKS OR TRAIL CROSSING COMMERCIAL OR INDUSTRIAL DRIVEWAYS SHALL BE CONSTRUCTED TO DRIVEWAY REQUIREMENTS INDICATED ON STR-9

RESIDENTIAL STREETS SHALL BE 7 TON DESIGN UNLESS OTHERWISE SPECIFIED

SUBGRADE MUST BE APPROVED BY THE ENGINEER

① SUBCUT WHERE UNSUITABLE MATERIALS EXIST AS DIRECTED BY THE ENGINEER IN THE FIELD. SUBCUT AREAS SHALL BE BACKFILLED WITH SUITABLE MATERIAL AS DETERMINED BY THE ENGINEER

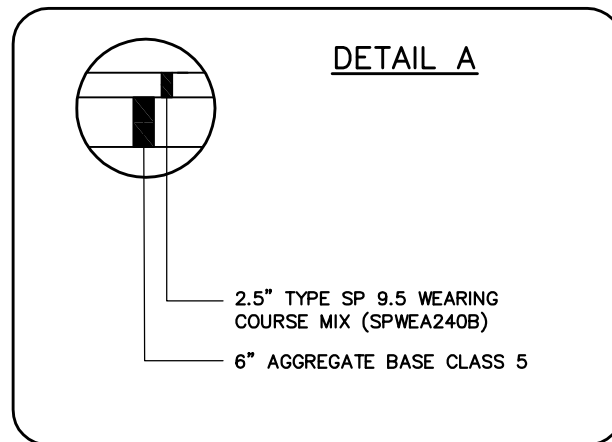
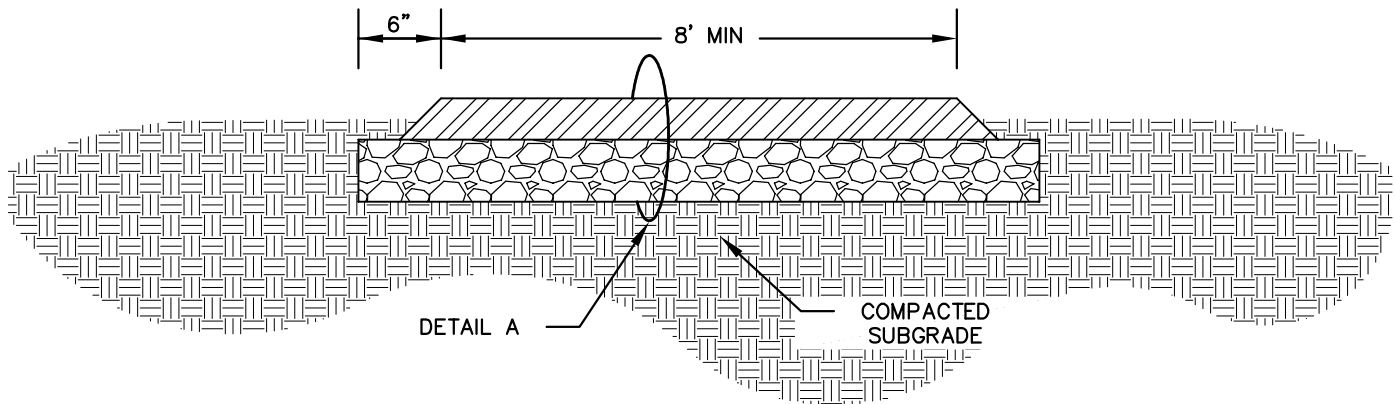


LAST REVISION
NOVEMBER 2014

RESIDENTIAL STREET TYPICAL SECTION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STR-6



NOTES:

PLACE ALL ASPHALT IN ONE LIFT TO PROVIDE A MINIMUM OF 2.5" COMPACTED DEPTH.

PROVIDE A MINIMUM BASE OF 6" COMPACTED AGGREGATE. IMPORT ADDITIONAL MATERIALS IF MILLING FAILS TO PRODUCE ADEQUATE BASE MATERIAL.

TAMP ALL TRAIL EDGES AT A 45° BEVEL.

CONTRACTOR IS RESPONSIBLE FOR ROUGH GRADING EDGES OF TRAIL CORRIDOR WITH ON-SITE MATERIAL. HOLD GRADES 3" LOWER THAN FINISHED TRAIL SURFACE TO ALLOW FOR ADDITIONAL TOPSOIL PLACEMENT AND SEED.

SLOPE OF BITUMINOUS TRAIL SHALL BE A MINIMUM OF 1% TO A MAXIMUM OF 2% TO THE DOWNHILL EDGE.

SIDEWALKS OR TRAIL CROSSING COMMERCIAL OR INDUSTRIAL DRIVEWAYS SHALL BE CONSTRUCTED TO DRIVEWAY REQUIREMENTS INDICATED ON STR-9.

SUBGRADE MUST BE APPROVED BY THE ENGINEER.

SUBCUT WHERE UNSUITABLE MATERIALS EXIST AS DIRECTED BY THE ENGINEER IN THE FIELD. SUBCUT AREAS SHALL BE BACKFILLED WITH SUITABLE MATERIAL AS DETERMINED BY THE ENGINEER.

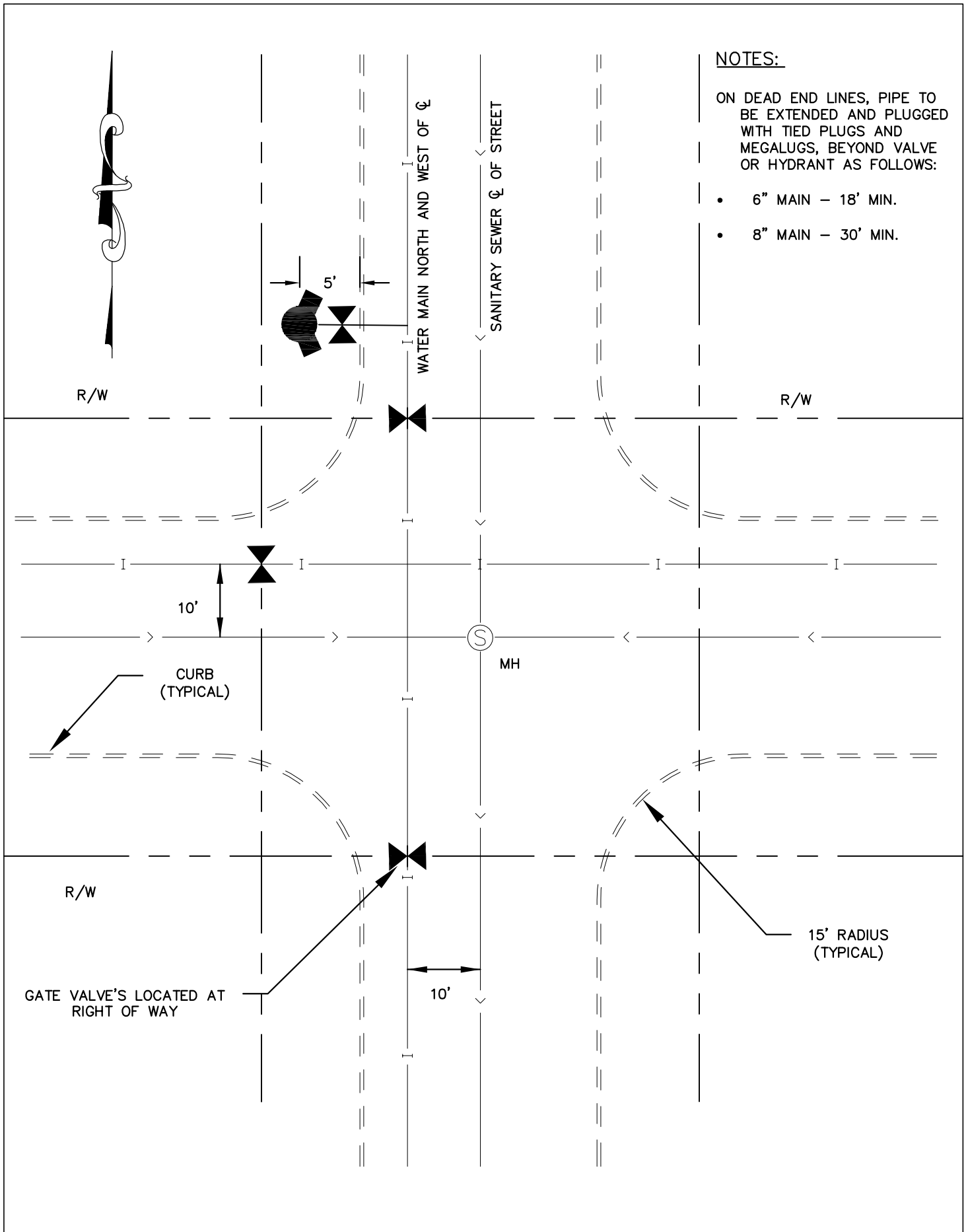


LAST REVISION
NOVEMBER 2014

BITUMINOUS TRAIL TYPICAL SECTION

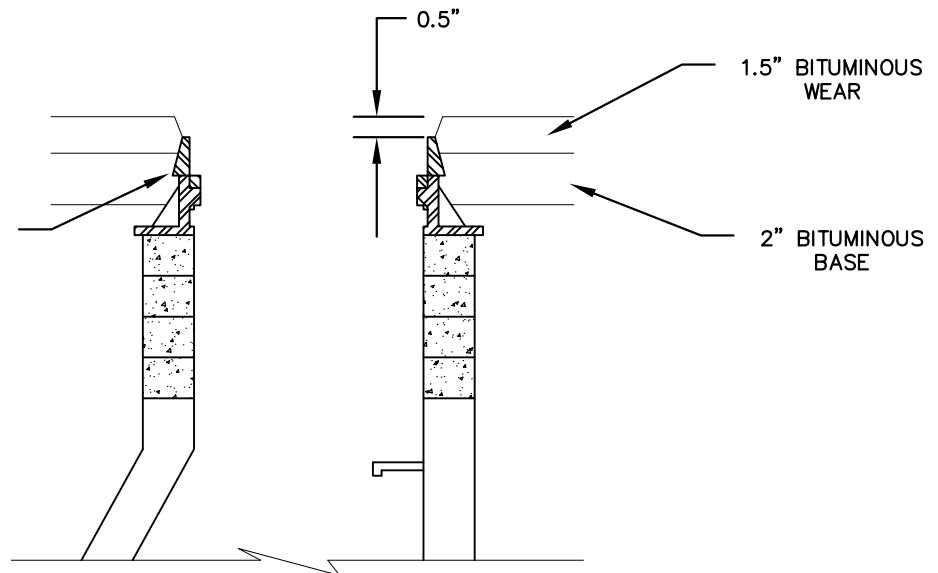
CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STR-7



DUCTILE IRON ADJUSTMENT RING AS MANUFACTURED BY ESS BROTHERS OR NEENAH FOUNDRY. ADJUSTING RING SHALL HAVE A 2" MINIMUM RISER

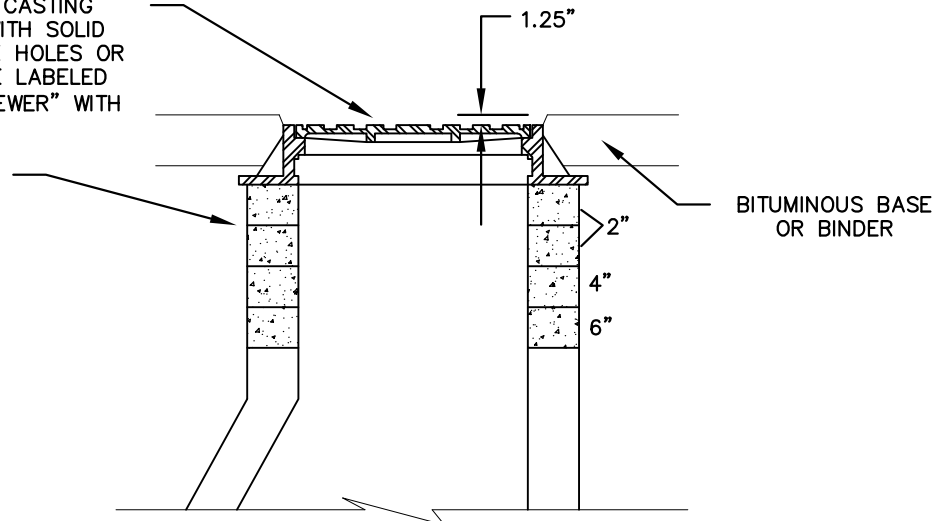
DUCTIL IRON ADJUSTMENT RING SHALL BE SEALED TO CASTING WITH EBS SUPER GLUE ADHESIVE OR APPROVED EQAUL



BITUMINOUS WEAR COURSE ADJUSTMENT DETAIL

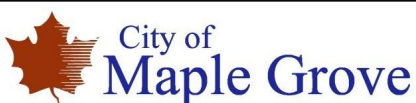
NEENAH MANHOLE FRAME AND CASTING R-1642, SELF SEALING B LID, WITH SOLID COVER AND TWO CONCEALED PICK HOLES OR APPROVED EQUAL. LID SHALL BE LABELED "SANITARY SEWER" OR "STORM SEWER" WITH 2" RAISED LETTERS

CONCRETE ADJUSTMENT RINGS SHALL BE SEALED TO THE CONE, CASTING, AND ONE ANOTHER BY USING A PREPACKAGED MOTOR MIX. TOTAL ADJUSTMENT MINIMUM 4" MAX 14".



NOTES:

2-PIECE OR CAST IRON ADJUSTING RINGS ARE NOT ALLOWED

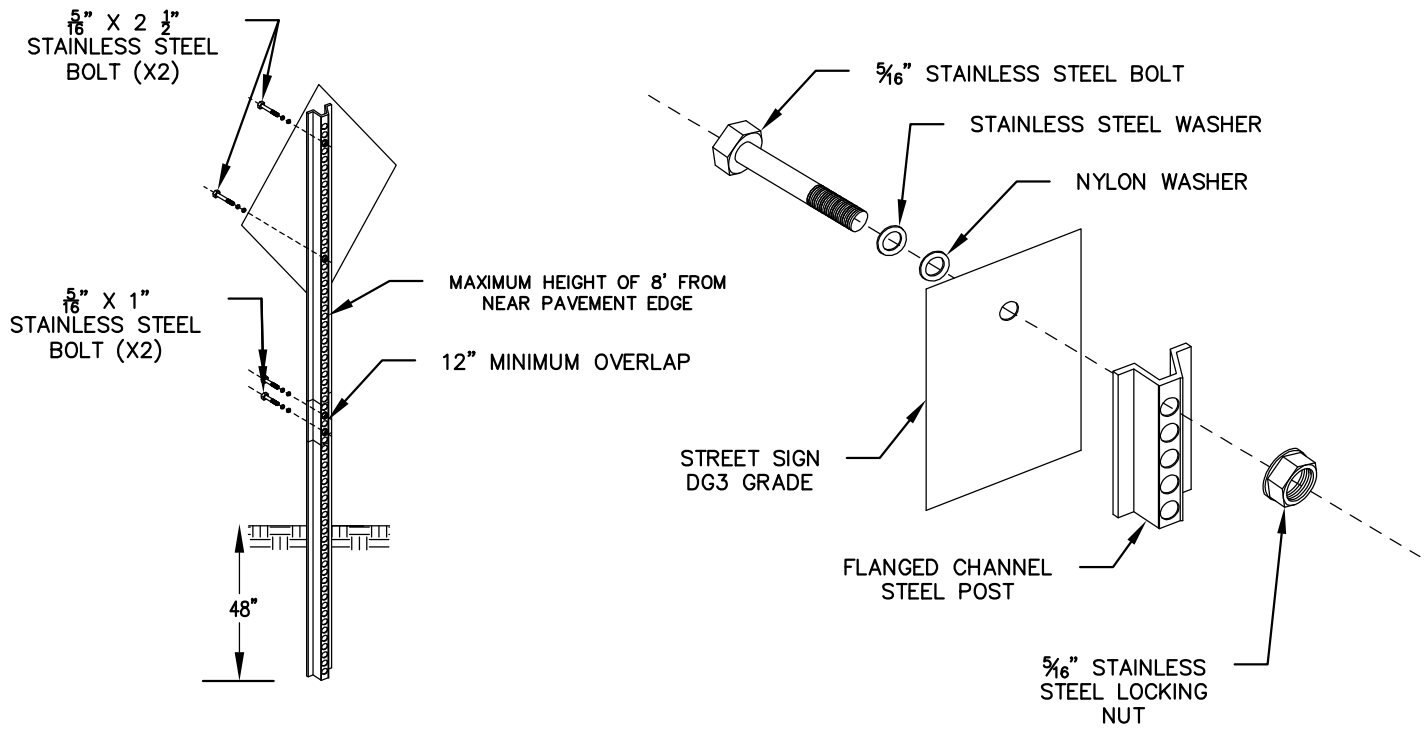


LAST REVISION
NOVEMBER 2014

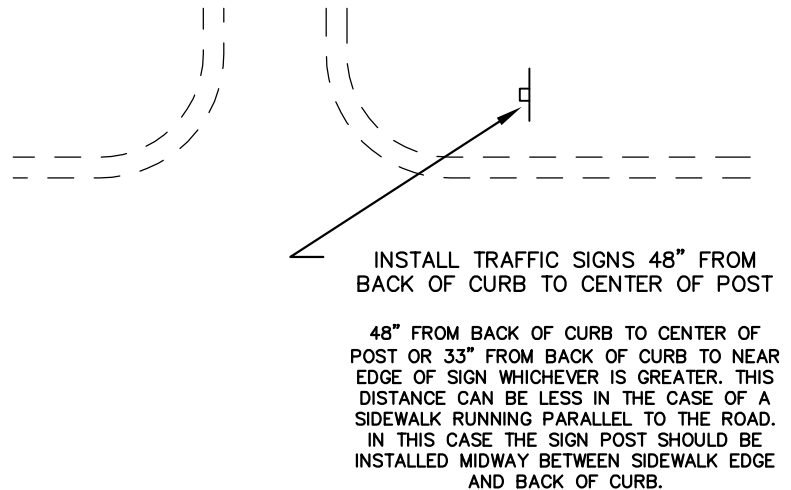
MANHOLE CASTING ADJUSTMENT DETAIL

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
STR-9



- 3M DIAMOND GRADE DG3 REFLECTIVE SHEETING
- UPPER SIGN POST SHALL BE A 7' 2 LBS/FT GALVANIZED WHEN THE SIGN BEING INSTALLED IS 30" STOP SIGN OR SMALLER TRAFFIC SIGN
- UPPER SIGN POST SHALL BE A 8' 2 LBS/FT GALVANIZED WHEN THE SIGN BEING INSTALLED IS 30" W-SERIES DIAMOND OR LARGER TRAFFIC SIGN
- SIGN INSTALLED IN CONCRETE SHALL HAVE AN APPROVED BREAK-AWAY DEVICE. THIS DEVICE CAN BE PICKED UP OR DELIVERED BY PUBLIC WORKS CONTACT PUBLIC WORKS SIGN SHOP FOR DETAILS.
- WHEN TRAFFIC SIGNS ARE INSTALLED BETWEEN A SIDEWALK AND THE BACK OF CURB SPLIT THE DISTANCE.
- KEEP ALL TRAFFIC SIGNS 4' AWAY IN ALL DIRECTIONS FROM PEDESTRIAN RAMPS



NOTES:

ALL REGULATORY AND STREET SIGNS MUST BE MAINTAINED THROUGHOUT CONSTRUCTION. TEMPORARY SIGNAGE MAY BE REQUIRED AND IS CONSIDERED INCIDENTAL.

ALL IN-PLACE SIGNS NOT SHOWN IN PLANS SHALL BE MAINTAINED IN-PLACE THROUGHOUT CONSTRUCTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

LOCATION OF ALL PROPOSED SIGNS ARE APPROXIMATE AND SHALL BE LOCATED BY THE ENGINEER IN THE FIELD PRIOR TO INSTALLATION.

SIGN PANELS—REFLECTIVE SHEETING WILL BE DG3 MATERIAL.

ALL TYPE C SIGN PANELS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE SIGN, SIGN POST, MOUNTING HARDWARE, SIGN AND LABOR FOR THE INSTALLATION OF ALL TYPE C SIGNS.

A SIGN PLAN SHOWING SIGN COLORS, SIZES AND LETTERING MUST BE SUBMITTED TO THE CITY OF MAPLE GROVE ENGINEERING DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO SIGN INSTALLATION.

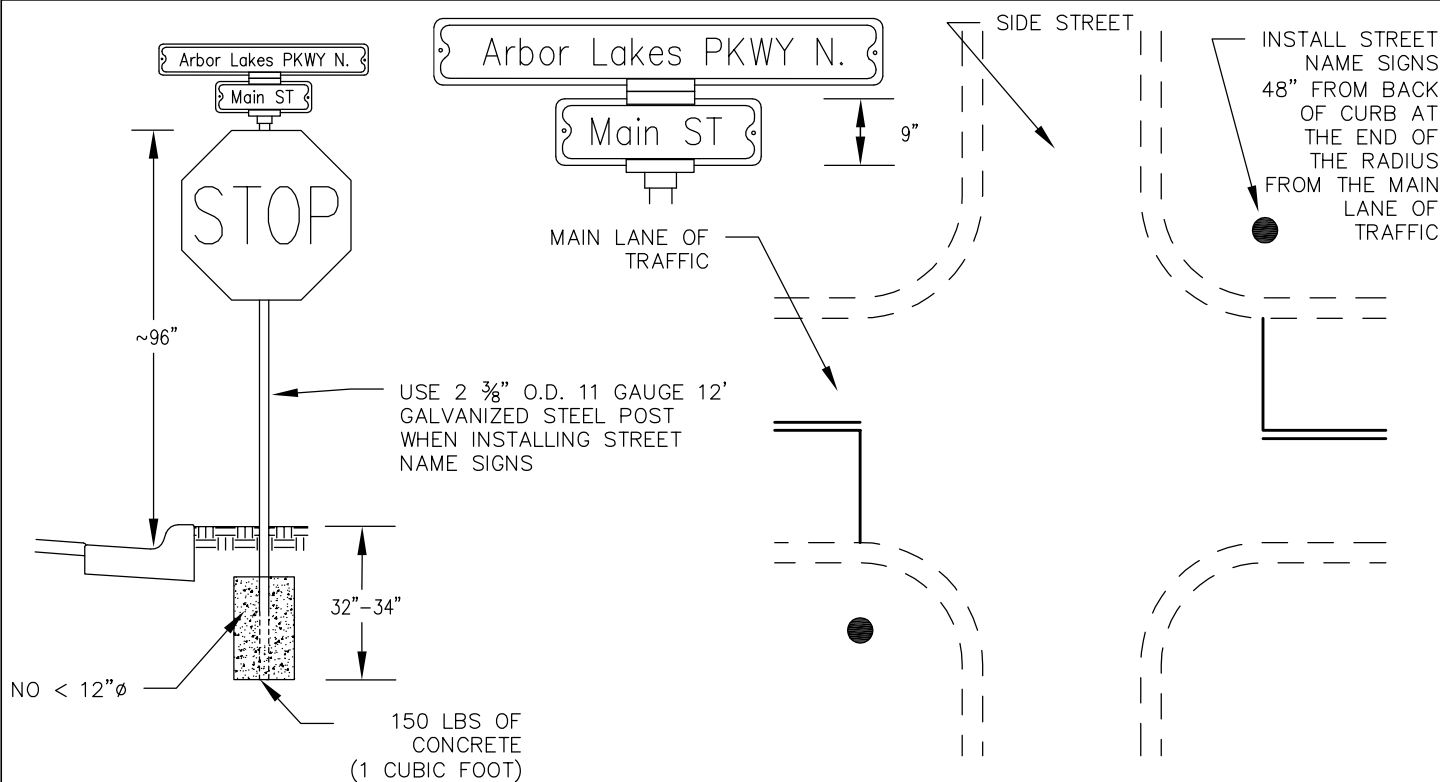


LAST REVISION
NOVEMBER 2014

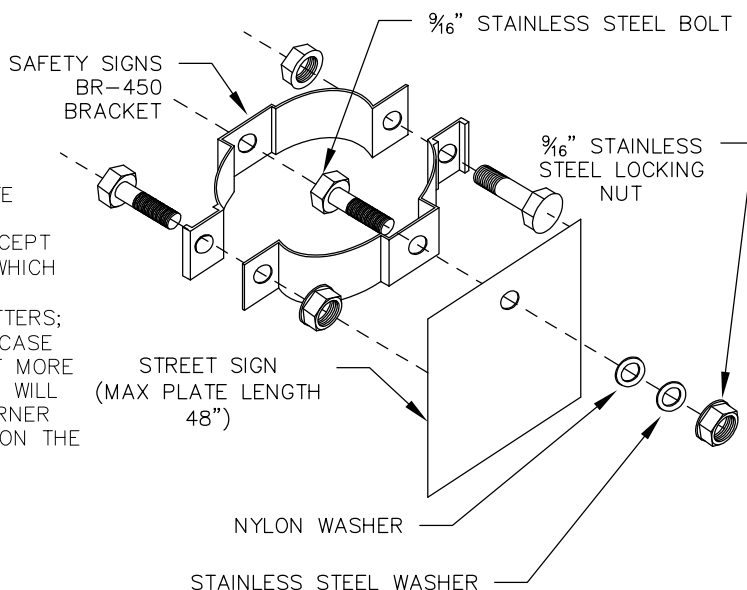
TRAFFIC SIGN INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SGN-1



- BLADE SPECIFICATION – 9xL,S/F,DG3/080,WG,E450,E450,63SP,UL
- LETTER SIZE – 6" UPPER CASE 4" LOWER CASE
- 3M DIAMOND GRADE DG3 REFLECTIVE SHEETING
- WHITE ON MNDOT GREEN BACKGROUND FOR PUBLIC STREETS
- WHITE ON MNDOT BROWN BACKGROUND FOR PRIVATE STREETS
- STREET NAMES SHALL BE SPELLED COMPLETELY EXCEPT FOR SUFFIXES (Ave, La, Ct, Cir, Pkwy, St, Pl, Dr) WHICH MAY BE ABBREVIATED ON LONGER STREET NAMES
- FIRST LETTER OF EACH WORD TO BE "CAPITAL" LETTERS; REMAINING LETTERS OF EACH WORD TO BE LOWER CASE
- MAXIMUM OF 2 STREET NAME BLADES PER POLE, IF MORE STREET NAME BLADES ARE REQUIRED. CONTRACTOR WILL NEED TO INSTALL ANOTHER POLE ON OPPOSITE CORNER
- ALWAYS INSTALL THE CROSS STREET NAME BLADE ON THE BOTTOM



NOTES:

ALL REGULATORY AND STREET SIGNS MUST BE MAINTAINED THROUGHOUT CONSTRUCTION. TEMPORARY SIGNAGE MAY BE REQUIRED AND IS CONSIDERED INCIDENTAL.

ALL IN-PLACE SIGNS NOT SHOWN IN PLANS SHALL BE MAINTAINED IN-PLACE THROUGHOUT CONSTRUCTION, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

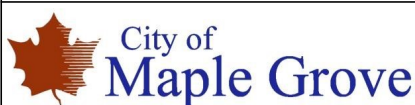
LOCATION OF ALL PROPOSED SIGNS ARE APPROXIMATE AND SHALL BE LOCATED BY THE ENGINEER IN THE FIELD PRIOR TO INSTALLATION.

SIGN PANELS—REFLECTIVE SHEETING WILL BE DG3 MATERIAL.

ALL TYPE C SIGN PANELS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. THE CONTRACTOR SHALL PROVIDE THE SIGN, SIGN POST, MOUNTING HARDWARE, SIGN AND LABOR FOR THE INSTALLATION OF ALL TYPE C SIGNS.

WHEN CONTRACTOR IS INSTALLING TYPE C SIGNS THEY MUST USE A BR-450 DOUBLE-SIDED SIGN BRACKET FROM SAFETY SIGNS (OR APPROVED EQUAL)

A SIGN PLAN SHOWING SIGN COLORS, SIZES AND LETTERING MUST BE SUBMITTED TO THE CITY OF MAPLE GROVE ENGINEERING DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO SIGN INSTALLATION.

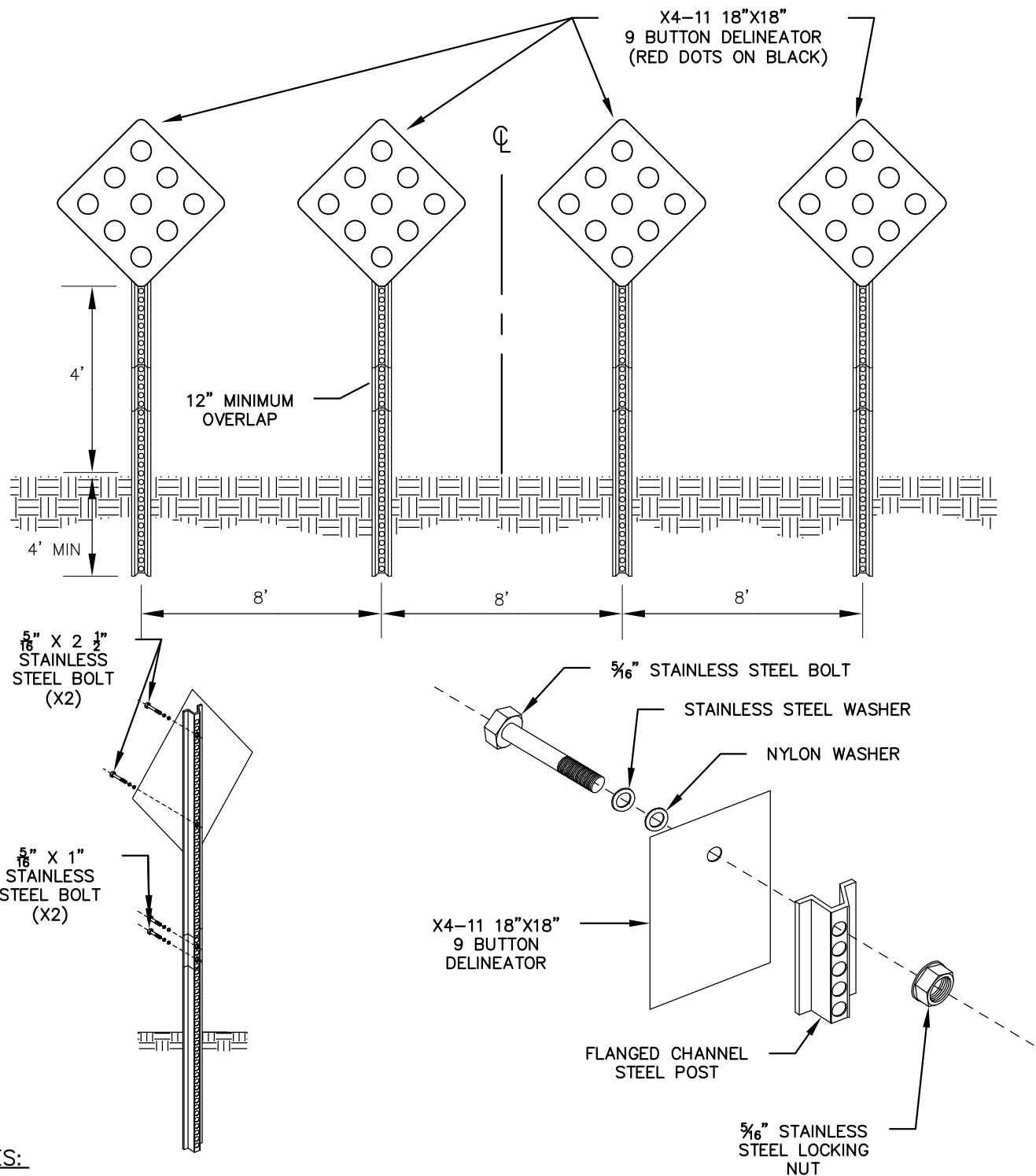


LAST REVISION
JANUARY 2016

STREET NAME BLADE INSTALLATION W/ TRAFFIC SIGN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
SGN-2



NOTES:

THE PLACEMENT OF THE BARRICADES SHALL BE 10' FROM THE EDGE OF THE BITUMINOUS ROADWAY WITH THE BARRICADE CENTERED ON THE ROADWAY FACING THE FLOW OF TRAFFIC

SIGN SHALL BE MADE OF 3M DIAMOND GRADE DG3 REFLECTIVE SHEETING

UPPER SIGN POST SHALL BE A 4' 2 LBS/FT GALVANIZED POST

LOWER SIGN POST SHALL BE A 8' 2 LBS/FT GALVANIZED POST

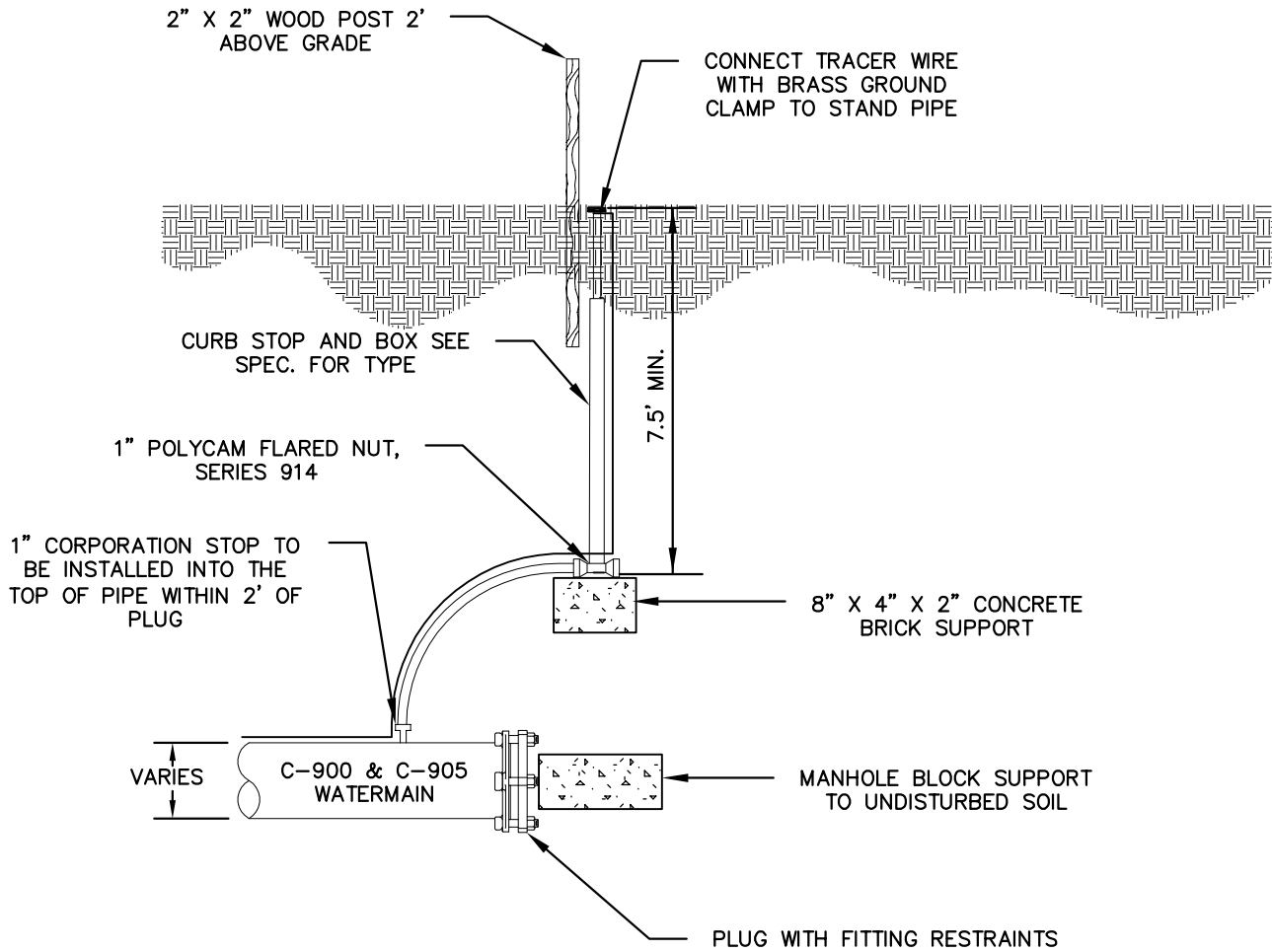


LAST REVISION
NOVEMBER 2014

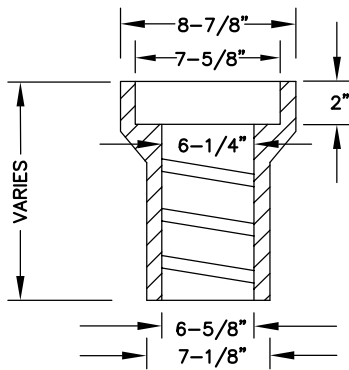
BARRICADE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

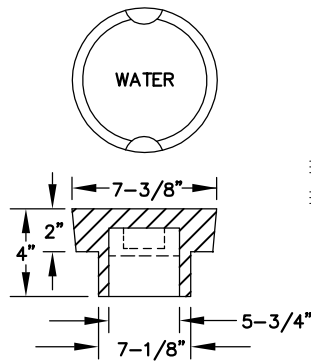
STANDARD
PLATE #
SGN-3



TOP SECTION



DROP LID

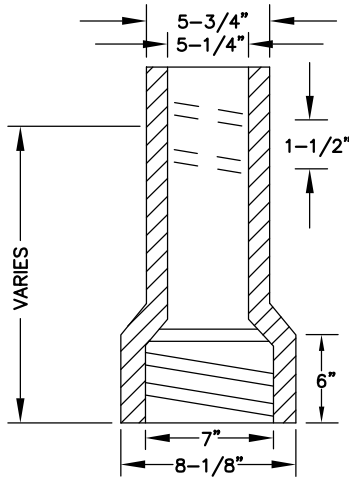


7.5' MINIMUM COVER REQUIRED OVER TOP OF WATER MAIN

FINISH GRADE

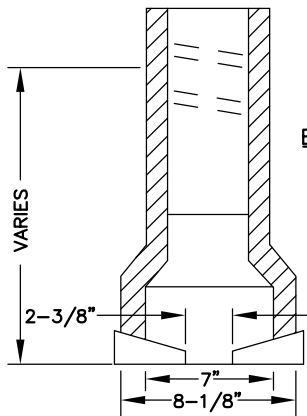
ADJUST TOP TO $\frac{1}{2}$ " BELOW GRADE. BOX TO BE SET TO PROVIDE 12" OF ADJUSTMENT

EXTENSIONS



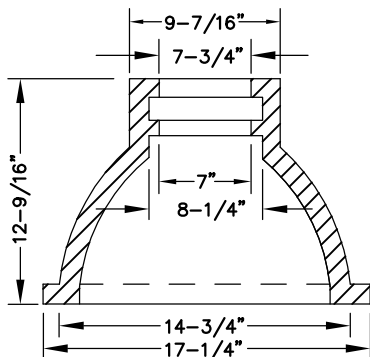
RESILIENT WEDGE GATE VALVE CONFORMING TO AWWA C-509-80 STANDARDS WITH 316 STAINLESS STEEL BOLTS

BOTTOM SECTION



RESTRAINT FITTING (TYP.)

#6 ROUND BASE



NOTES:

ALL SECTIONS SHALL BE TYLER 6860 G OR SIGMA VB261 OR VB268 WITH $\frac{1}{4}$ " WALL THICKNESS

ALL BOLTS INCLUDING T-BOLTS SHALL BE COR-BLUE OR STAINLESS STEEL 316 GRADE

DROP LID SHALL EITHER BE A TYLER NO. 6865 OR SIGMA LABELED WATER

NO SCREW IN TOP SECTIONS OR ADJUSTING RINGS ARE ALLOWED



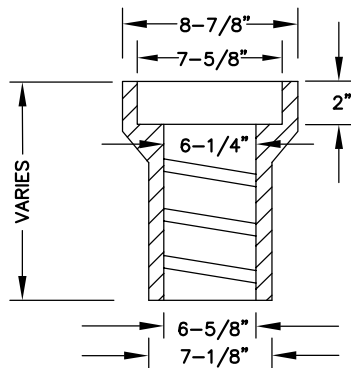
LAST REVISION
NOVEMBER 2014

GATE VALVE AND BOX INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

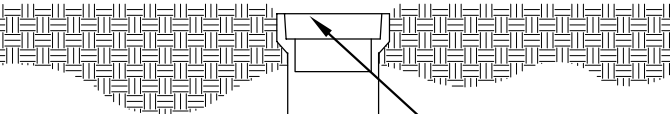
STANDARD
PLATE #
WM-2

TOP SECTION

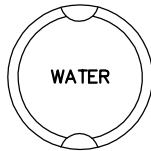


7.5' MINIMUM COVER REQUIRED OVER TOP OF WATER MAIN

FINISH GRADE

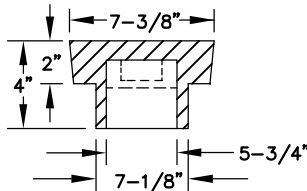
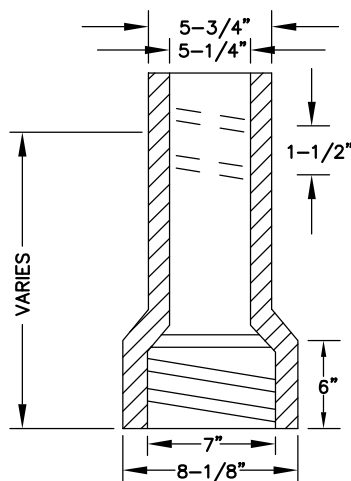


DROP LID



ADJUST TOP TO 1/2\"/>

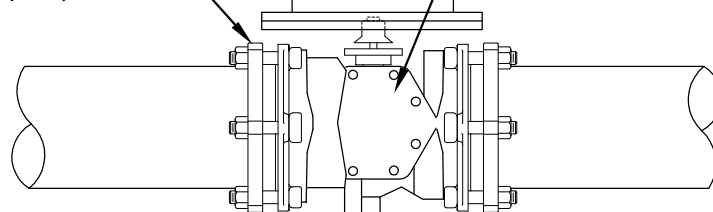
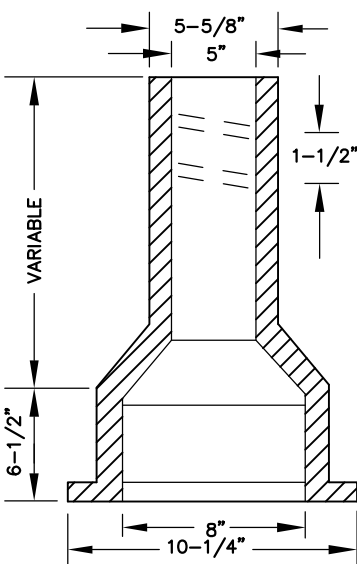
EXTENSIONS



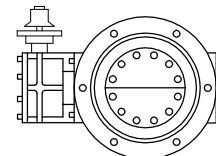
RESTRAINT FITTING (TYP.)

BUTTERFLY VALVE (12\"/>

BOTTOM SECTION



END VIEW



NOT TO SCALE

NOTES:

ALL SECTIONS SHALL BE TYLER 6860 G OR SIGMA VB261 OR VB268 WITH 1/4\"/>

ALL BOLTS INCLUDING T-BOLTS SHALL BE COR-BLUE OR STAINLESS STEEL 316 GRADE

DROP LID SHALL EITHER BE A TYLER NO. 6865 OR SIGMA LABELED WATER

NO SCREW IN TOP SECTIONS OR ADJUSTING RINGS ARE ALLOWED

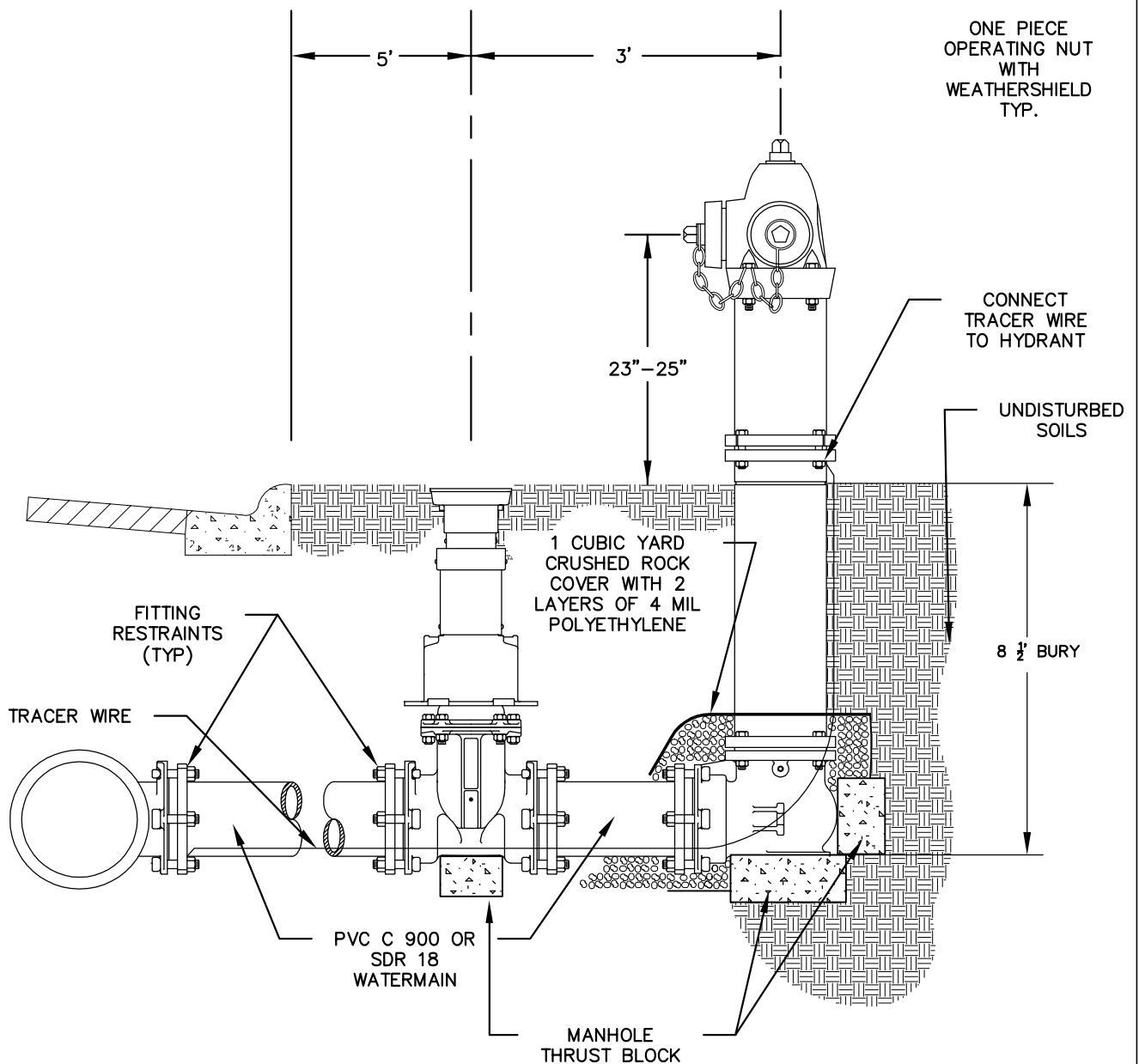


LAST REVISION
NOVEMBER 2014

BUTTERFLY VALVE AND BOX INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-3



NOTES:

HYDRANT SHALL EITHER BE WATEROUS PACER MODEL WB67-250 OR CLOW MEDALLION HYDRANT

HYDRANT SHOULD HAVE TWO (2)-4 INCH AND ONE-HALF (4 ½") PUMPER CONNECTIONS WITH WATEROUS THREADS AS FOLLOWS: 4-1/2" THREADS, 5 ⅝" O.D. BY 4 THREADS PER INCH AND A 16" BREAK OFF.

ALL HYDRANTS AND GATE VALVES SHALL HAVE MECHANICAL JOINT CONNECTIONS.

ALL VALVES TO OPEN COUNTER-CLOCKWISE.

ALL BACKFILL SHALL BE PROPERLY COMPACTED.

FIRE HYDRANTS SHALL BE PAINTED RED AT THE FACTORY.

WEEP HOLE TO REMAIN OPEN



LAST REVISION
NOVEMBER 2014

HYDRANT AND GATE VALVE INSTALLATION

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-4

1" PVC BLOW OFF PIPE AND
2"x2" WOOD POST 1' ABOVE
GRADE

CURB STOP AND BOX (SEE SPEC. FOR
TYPE) AND 2"x2" WOOD POST 1'
ABOVE GRADE

CONNECT TRACER WIRE
WITH BRASS GROUND
CLAMP TO STAND PIPE

7.5' MIN.

TRACER WIRE

1" TO 2" PVC FOR WATER
METER AND 2" X 2" WOOD
POST 1' ABOVE GRADE

8"x4"x2" CONCRETE
BRICK SUPPORT

POLYCAM FLARED NUT
FITTING

MOCK ROCK ENCLOSURE

VACUUM BREAKER
NEEDS TO BE 12" - 18"
ABOVE THE HIGHEST
IRRIGATION HEAD

WATER
METER

1/4" TURN
BALL
VALVE

CONNECT TRACER WIRE
WITH BRASS
GROUND CLAMP

TRACER
WIRE

MOCK ROCK ENCLOSURE

TREATED
TIMBER

NOTES:

MOCK ROCK ENCLOSURE FOR BACKFLOW DEVICE IS A XWMOCK-0013-02 56"L X 30" H INSTALLED AND SECURED TO TREATED LUMBER

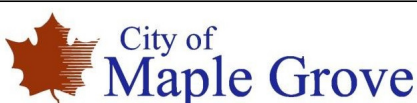
CURB BOX SHALL HAVE A STATIONARY ROD

CURB BOX SHALL EXTEND FROM 84" TO 96"

SERVICE SHALL BE BEDDED IN GRANULAR BORROW

CURB BOXES INSTALLED IN AREAS WHERE THE BOULEVARD IS TO BE CUT AT A LATER DATE, TOP OF CURB BOX SHALL BE SAME ELEVATION AS TOP OF CURB

CURB STOP SHALL BE INSTALLED AT LEAST 9' FROM PROPERTY LINE (IN GREEN SPACE)

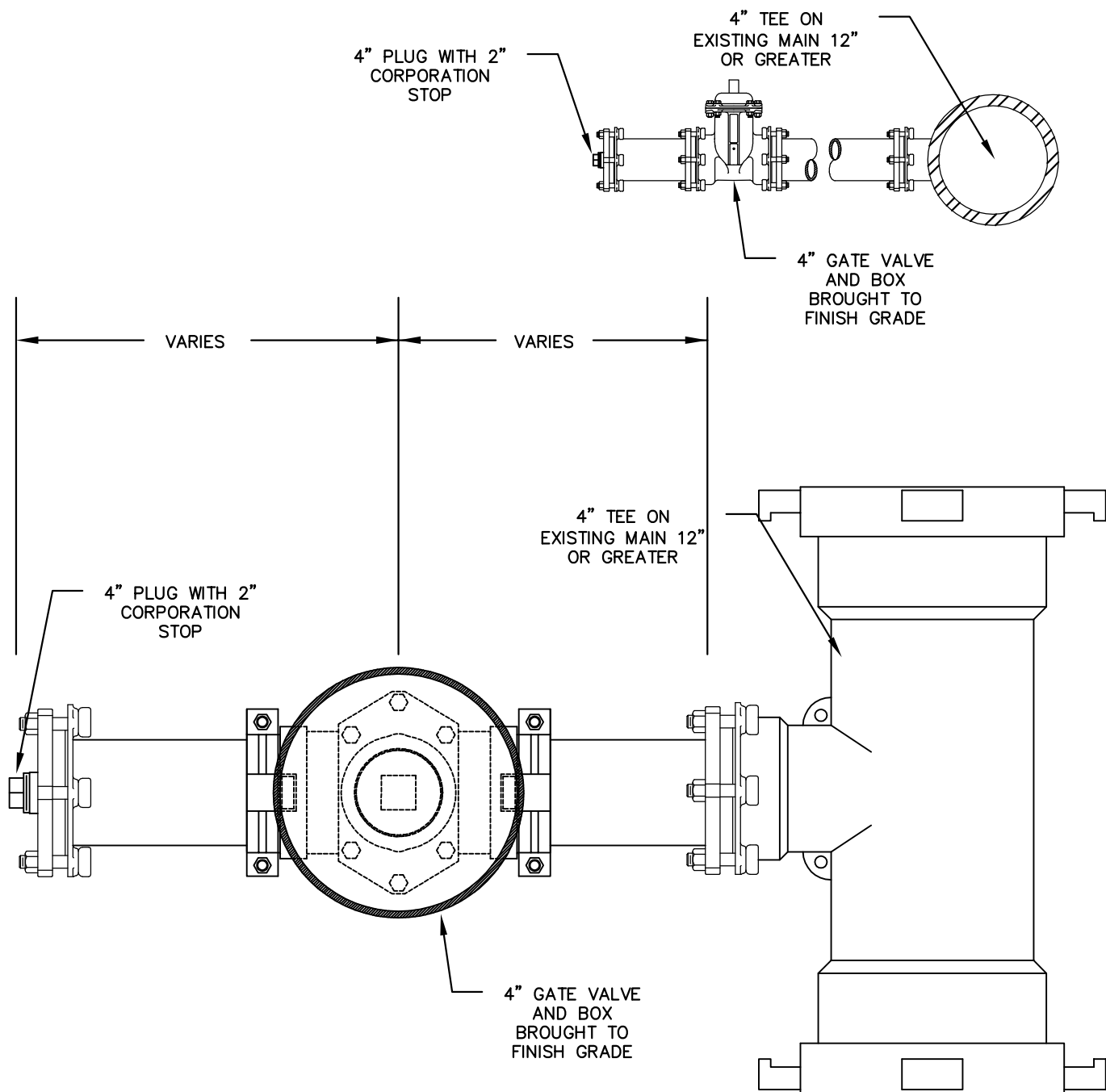


LAST REVISION
NOVEMBER 2014

IRRIGATION SERVICE W/ BLOW OFF, METER AND MOCK ROCK ENCLOSURE

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-5



NOTES:

WHEN THE IRRIGATION LINE IS CONNECTED TO A 12" WATERMAIN OR GREATER. INSTALL A 4" TEE AND 4" GATE VALVE TO HELP ISOLATE THE IRRIGATION LINE FROM THE MAIN.

SHORT ROD ANY SLIP JOINTS

CONTRACTOR WILL NEED TO INSTALL A 4" CAP WITH A 2" CORPORATION AT LEAST 9' FROM PROPERTY LINE (IN GREEN SPACE)

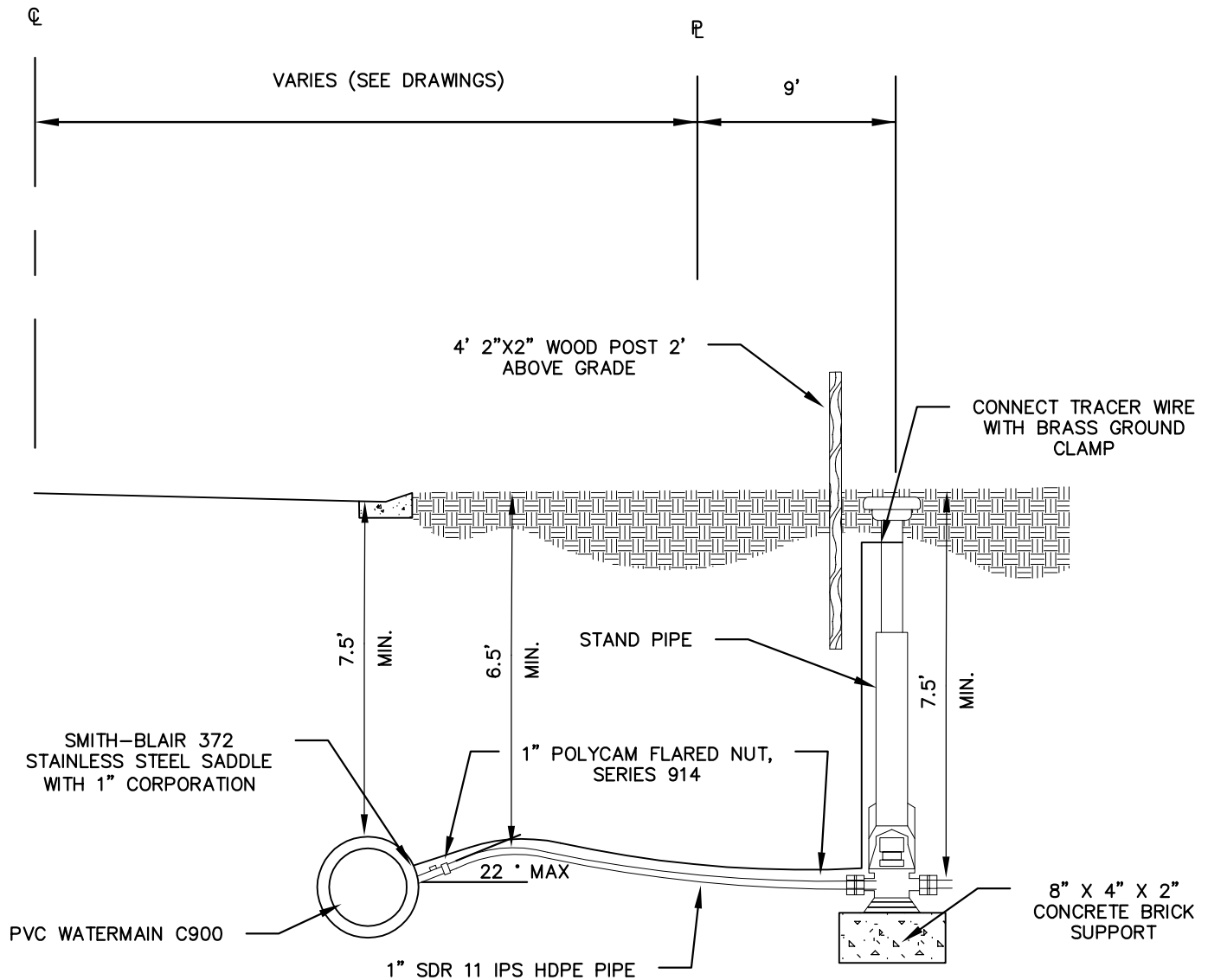


LAST REVISION
NOVEMBER 2014

IRRIGATION CONNECTION TO WATERMAIN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-6



NOTES:

ANY CURB STOP LOCATED IN BLACKTOP OR CONCRETE DRIVEWAY OR SIDEWALK SHALL BE COVERED WITH A 10" G.V. BOX TOP SECTION.

ALL WATER SERVICES SHALL BE 1" SDR 11 HDPE BLACK POLY.

ALL NEW WATER SERVICES INSTALLED SHALL USE A SMITH-BLAIR 372 STAINLESS STEEL SADDLE.

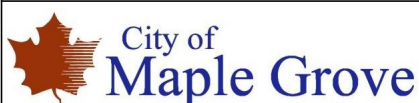
CORPORATION SHALL BE A 1" FORD FB 600-4-NL, MCDONALD 74701-B, MUELLER B-25000-N OR OWNER APPROVED ALTERNATE.

CURB STOP AND BOX SHALL BE 1" FORD B22-444-M-NL, MCDONALD 76104, MUELLER B-25154 OR OWNER APPROVED ALTERNATE WITH A STATIONARY ROD AND BE ABLE TO ADJUST FROM 84" TO 96".

WATER SERVICE MUST BE CONTINUOUS WITH NO JOINTS.

SANITARY AND WATER SERVICE LINES SHALL BE INSTALLED IN THE SAME TRENCH WITH 3 FEET OF SEPARATION, WATER SERVICE ON UPSTREAM SIDE OF SANITARY SERVICE.

CURB BOXES INSTALLED IN AREAS WHERE THE BOULEVARD IS TO BE CUT AT A LATER DATE, TOP OF CURB BOX SHALL BE SAME ELEVATION AS TOP OF CURB.

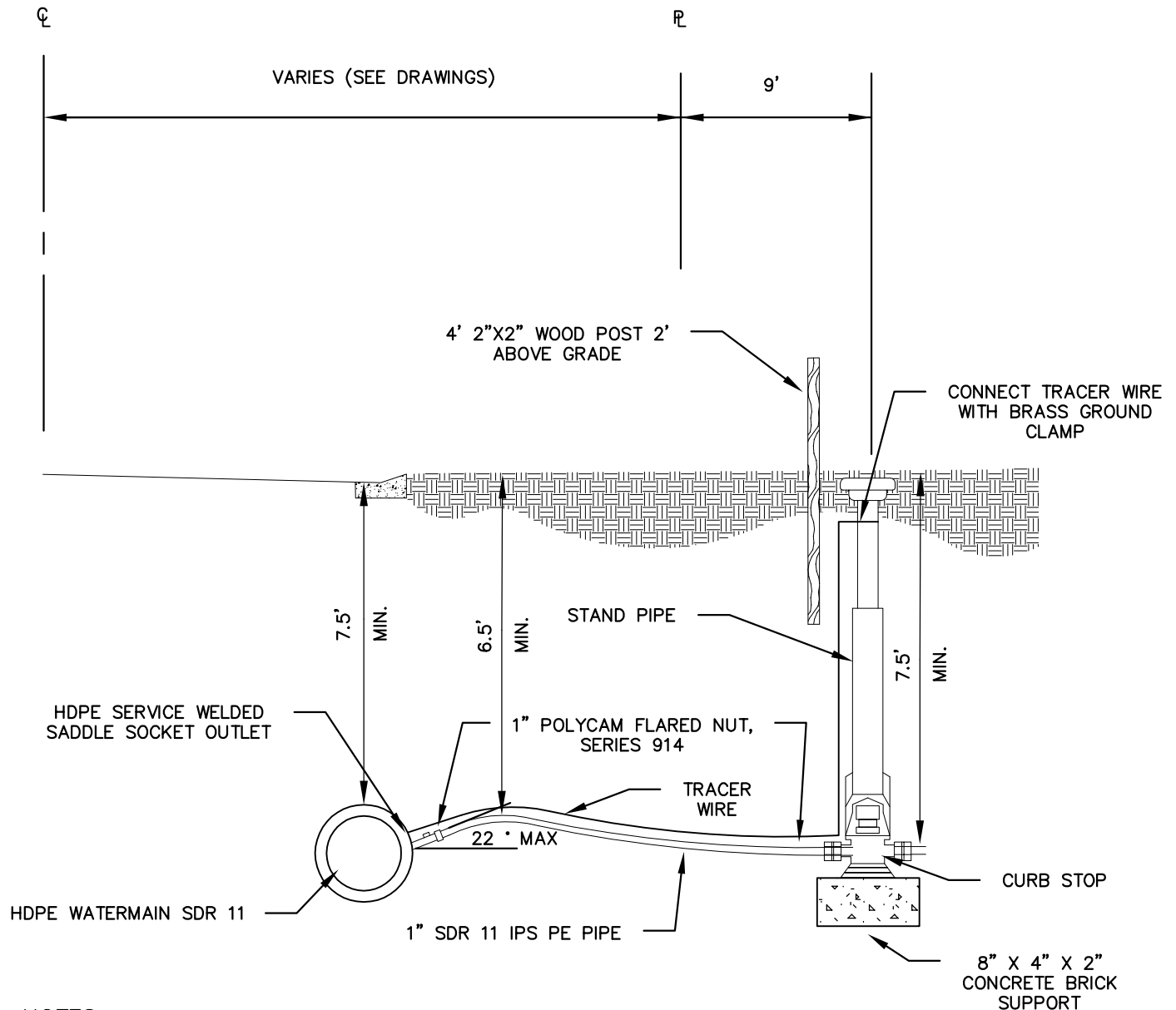


LAST REVISION
NOVEMBER 2014

1" WATER SERVICE WITH PVC WATERMAIN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-7



NOTES:

ANY CURB STOP LOCATED IN BLACKTOP OR CONCRETE DRIVEWAY OR SIDEWALK SHALL BE COVERED WITH A 10" G.V. BOX TOP SECTION.

ALL WATER SERVICES SHALL BE 1" SDR 11 IPS HDPE BLACK POLY.

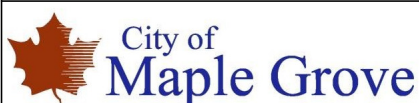
CORPORATION SHALL BE A 1" FORD FB 600-4-NL, MCDONALD 74701-B, MUELLER B-25000-N OR OWNER APPROVED ALTERNATE.

CURB STOP AND BOX SHALL BE 1" FORD B22-444-M-NL, MCDONALD 76104, MUELLER B-25154 OR OWNER APPROVED ALTERNATE WITH A STATIONARY ROD AND BE ABLE TO ADJUST FROM 84" TO 96".

WATER SERVICE MUST BE CONTINUOUS WITH NO JOINTS.

SANITARY AND WATER SERVICE LINES SHALL BE INSTALLED IN THE SAME TRENCH WITH 3 FEET OF SEPARATION. WATER SERVICE ON THE UPSTREAM SIDE OF THE SANITARY SERVICE.

CURB BOXES INSTALLED IN AREAS WHERE THE BOULEVARD IS TO BE CUT AT A LATER DATE, TOP OF CURB BOX SHALL BE SAME ELEVATION AS TOP OF CURB.

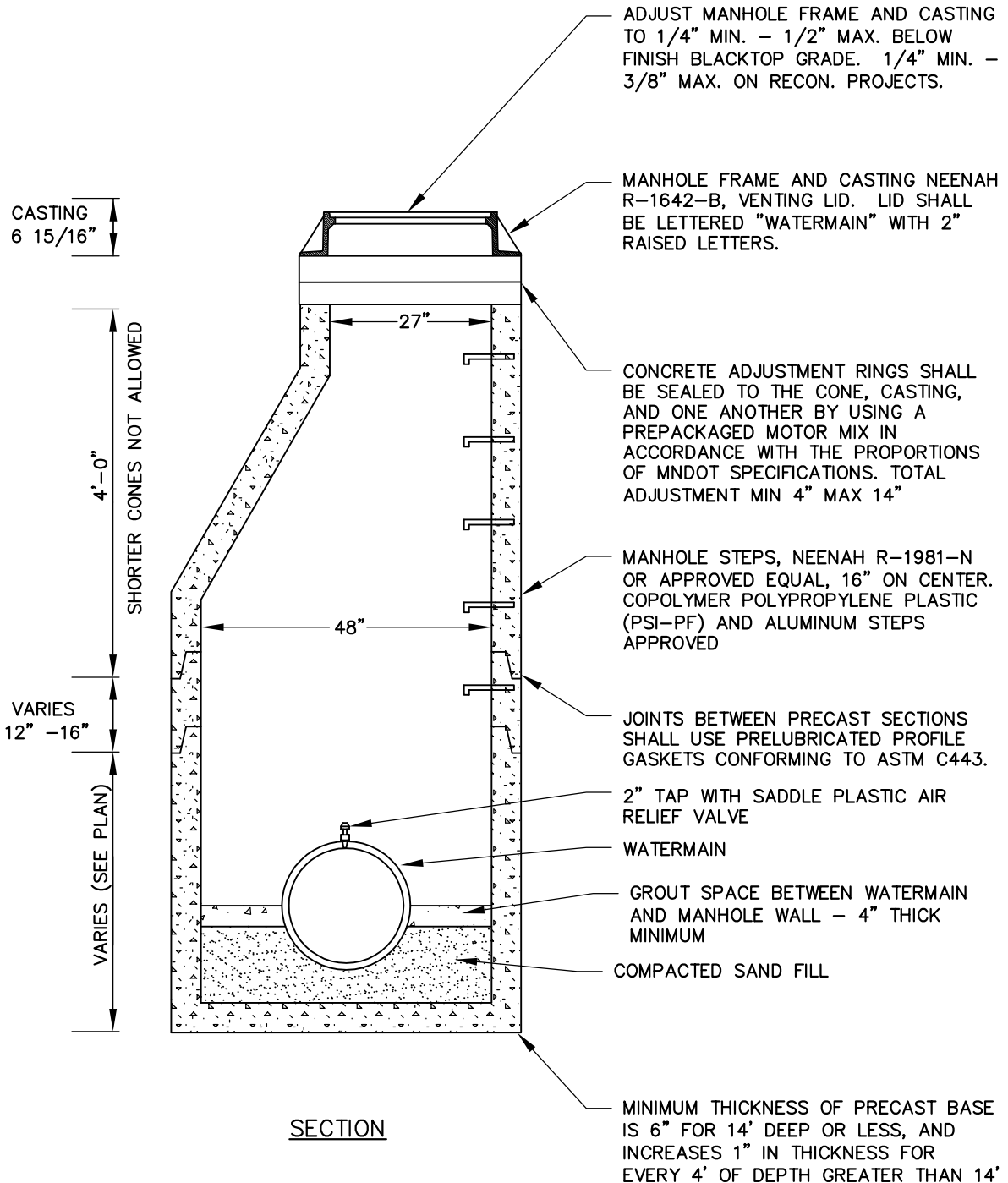


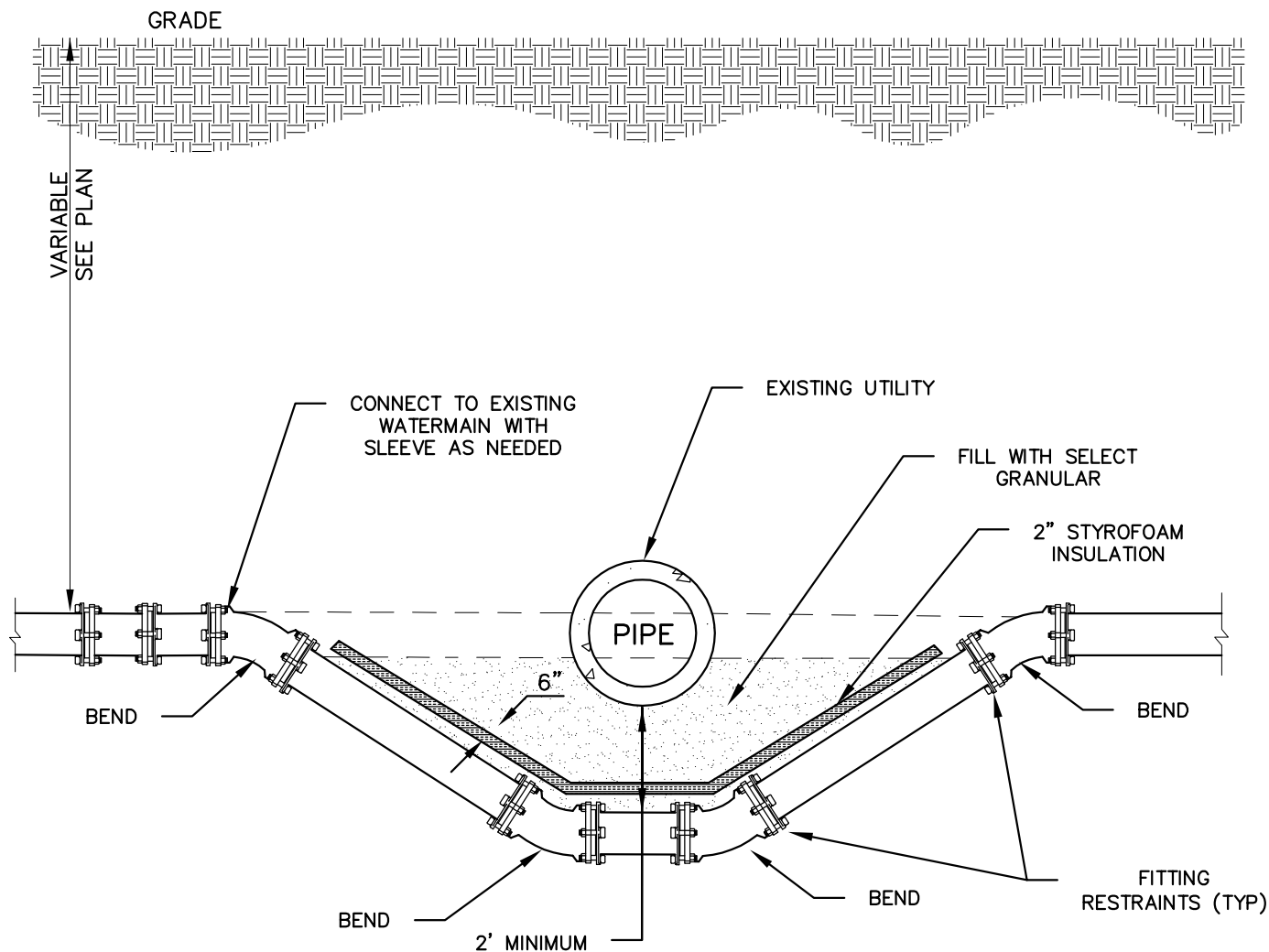
LAST REVISION
NOVEMBER 2014

1" WATER SERVICE WITH HDPE WATERMAIN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

STANDARD
PLATE #
WM-8





NOTES:

PREFERRED METHOD OF OFFSET WATERMAIN IS OVER DEPTH EXCAVATION.

PLACE 6" COMPACTED SAND BELOW INSULATION

SEE STANDARD PLATE WM-11 TO DETERMINE THE REQUIRED CONCRETE THRUST BLOCKING

ALL NUTS AND BOLTS TO BE 316 STAINLESS STEEL OR CORE BLUE

MAINTAIN A 2.0' MINIMUM CLEAR ZONE SEPARATION BETWEEN CONFLICTING UTILITIES

ON NEW WATERMAIN DIVE WATERMAIN UNDER CONFLICTING PIPE

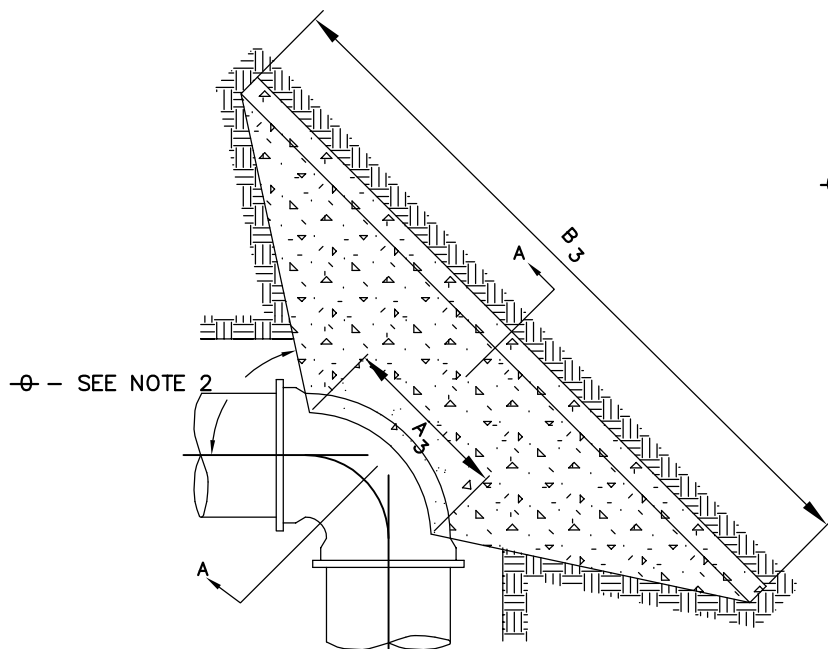


LAST REVISION
NOVEMBER 2014

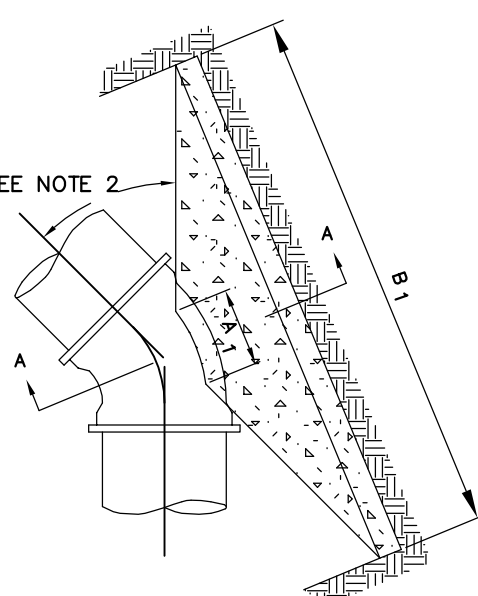
OFFSET WATERMAIN

CITY OF MAPLE GROVE ENGINEERING
& PUBLIC WORKS DEPARTMENTS

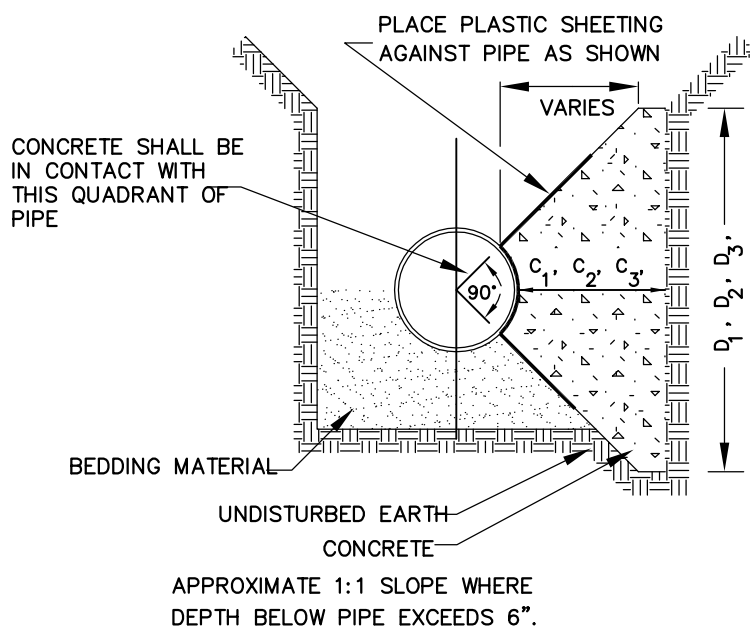
STANDARD
PLATE #
WM-10



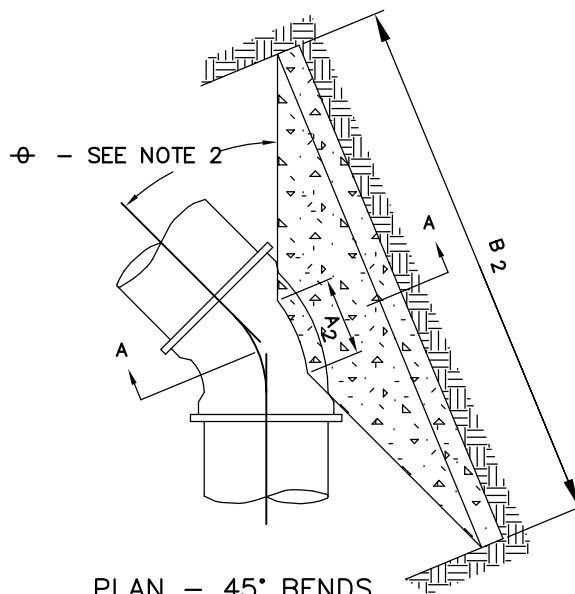
PLAN - 90° BENDS



PLAN - 22 1/2°-45° BENDS



SECTION A-A



PLAN - 45° BENDS

NOTES:

DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 PSI AND AN EARTH RESISTANCE OF 1 TON PER SQ. FT.

DIMENSION C1, C2, C3 SHOULD BE AS LARGE ENOUGH TO MAKE ANGLE $\geq 45^\circ$

DIMENSION A1, A2, A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH M.J. BOLTS.

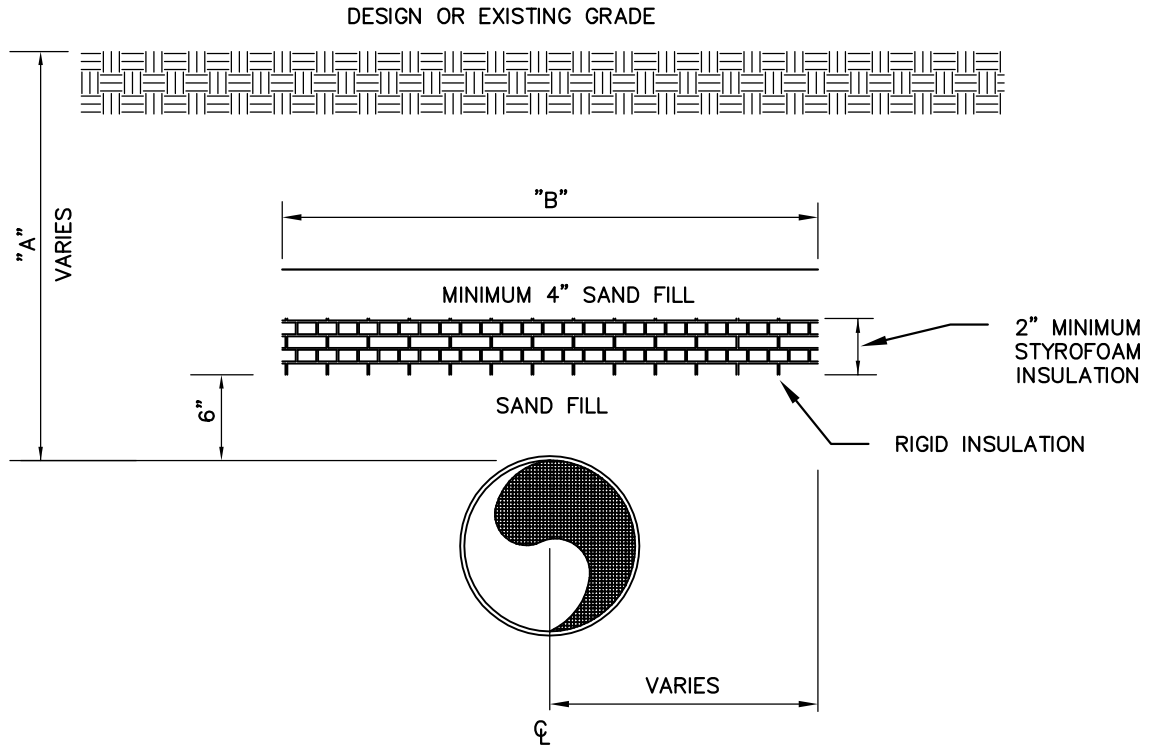
SHAPE OF BACK OF BUTTRESS MAY VARY AS LONG AS POUR IS AGAINST FIRM UNDISTURBED EARTH.

MEGA LUGS MAY BE USED IN CONJUNCTION WITH MIXED CONCRETE THRUST BLOCKING.

READY MIX CONCRETE ONLY MAY BE USED (MNDOT SPEC. 2461, GRADE "B")

BUTTRESS DIMENSIONS

PIPE SIZE	22 1/2° BEND		45° BEND		TEES/90° BEND	
	B 1	D 1	B 2	D 2	B 3	D 3
6"	1'-5"	1'-5"	1'-5"	1'-5"	2'-1"	1'-6"
8"	1'-5"	1'-5"	2'-1"	1'-6"	2'-8"	2'-0"
12"	1'-10"	1'-10"	3'-4"	2'-0"	4'-9"	2'-6"
16"	3'-0"	2'-0"	3'-10"	3'-0"	6'-2"	3'-6"
20"	3'-6"	2'-8"	5'-6"	3'-4"	8'-4"	4'-0"
24"	4'-4"	3'-0"	6'-10"	3'-10"	9'-8"	5'-0"



NOTES:

PIPE SHALL BE CENTERED UNDER INSULATION UNLESS OTHERWISE SPECIFIED

<u>COVER OVER PIPE – "A"</u>	<u>WIDTH OF INSULATION BOARD – "B"</u>
2'	12'
3'	10'
4'	8'
5'	6'
6'	4'

2" OF INSULATION = 2' OF COVER